



**SHARING OUR
KNOWLEDGE
OF CREATE
SUSTAINABLE
CAMPUSES**



Sharing Our Knowledge to Create Sustainable Campuses

Coordinated by : Gisela Frias & Margarita Hurtado
February 2014

Project number: IDRC: 107108-00020699-012
Project name: IDRC: Sharing Our Knowledge to Create Sustainable Campuses
Country/Region: Canada and México

Institutions involved :

Dawson College
3040 Sherbrooke St. W.
Westmount, Quebec
H3Z 1A4
Canadá

Instituto Mexicano para el Desarrollo de Ciudades Verdes, S.C.
Rayón 30
Centro Histórico
C.P. 62000
Cuernavaca, Morelos, México

ISBN: 978-607-95722-5-9

This work is used with the permission of Gisela Frías and Margarita Hurtado

Synopsis:

Based on experiences and ideas emanating from the bi-national project “Sustainable Campuses: Sharing our Knowledge for Social and Environmental Sustainability” as well as from other like institutions, this text seeks to inspire and make educational facilities interested in moving towards sustainability.

Key concepts: Education, sustainability, campuses, environmental management in schools, methodological strategies, poverty



This work falls under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International license

SHARING OUR KNOWLEDGE TO CREATE SUSTAINABLE CAMPUSES

Coordinated by
Gisela Frías
Margarita Hurtado Badiola

Sharing Knowledge to Create Sustainable Campuses is the fruit of our collaborative labour, those of us who journeyed together down the path towards the realization of our dream to take care of the global village by starting with our schools.

Chris Adam
Cindy Elliott
Isabel Enríquez González Saravia
Eduardo Salvador López Hernández
Teresita Maldonado Salazar
María Luisa Montes Mendoza
Julio Mora González
Laura Uribe García
Juan Salvador Nambo de los Santos
Katie Wheatley

Coordinated by :

Margarita Hurtado Badiola
Gisela Frías

Cover design and page layout by : Ana Laura Lobato Guzmán

Layout of the electronic book by : Armando Navarrete

Translated by : Douglas Kristopher Smith

Translation edited by : Kelly Akerman

This book was printed with the financial support of:

Dawson College
UPN Morelos
Instituto Mexicano para el Desarrollo de Ciudades Verdes, S.C.
Escuela Particular Normal Superior “Lic. Benito Juárez”, A. C.
International Development Research Centre (IDRC-Canadá)

We thank the contribution of Mundo Sustentable A.C. to cover the costs of the edition of this publication

SHARING OUR KNOWLEDGE TO CREATE SUSTAINABLE CAMPUSES



TABLE OF CONTENTS

Introduction	6
1. Let's talk about environmental education	9
2. Let's talk about environmental management in schools	13
3. Building bridges: Methodological strategies	15
4. Lines of action to support environmental management in schools	19
5. Let's talk about sustainability	21
5.1 What is sustainability?	
6. Sustainable campuses	25
6.1 What is a sustainable campus?	
6.2 Necessary steps in the realization of a sustainable campus	
6.3 Concept mapping as a tool in the designing of a sustainable campus	
6.3.1 Establish institutional sustainability policies	
6.3.1.1 An example of sustainable policies: The case of Dawson College:	
6.3.2 Make changes to facilities and infrastructure on campus	
6.3.3 Environmentalize the curriculum and research	
6.3.3.1 An example of an environmentalized curriculum: The case of UJAT	
7. What to care for on a sustainable campus	39
7.1 Caring for life	
7.1.1 What is biodiversity?	
7.1.2 What's going on with our planet's biodiversity?	
7.1.3 Why are we losing biodiversity?	
7.1.4 How can we protect biodiversity on campus?	
7.1.5 Educational tools for caring for biodiversity on campus	
7.1.5.1 Short stories	
7.1.5.2 Storytelling	
7.1.5.3 Our Living Neighbours	
7.1.5.4 Making an inventory of biodiversity on campus	
7.1.5.5 Inviting even more neighbours: bees and butterflies	
7.2 Caring for the water	
7.2.1 Where is all that water?	
7.2.2 The water on the planet	
7.2.3 Water in Mexico	

- 7.2.4 Water in Morelos
- 7.2.5 How to implement sustainable water practices on campus
- 7.2.6 Campus water evaluation guide
- 7.2.7 Best practices for caring for the water on campus
 - 7.2.7.1 Benito Juárez Private Teachers College's *Living Water* Project
 - 7.2.7.2 A Dawson Green Earth Club action
- 7.3 Caring for energy
 - 7.3.1 What is energy? Uses, types and alternative forms
 - 7.3.2 Governmental action for energy efficiency
 - 7.3.3 An example of energy efficiency in practice at a sustainable campus
- 7.4 Taking care that there is no garbage
 - 7.4.1 Classification of waste
 - 7.4.2 Eco-mapping
 - 7.4.3 Doing the math to understand

8. Where there is poverty, there cannot be sustainability

77

- 8.1 What is poverty?
- 8.2 Poverty on a worldwide, national and state level
- 8.3 The role of a sustainable campus in fighting poverty
 - 8.3.1 Campus poverty evaluation guide
- 8.4 Working so that people can reach their full potential
- 8.5 Best practices in helping humans beings thrive
 - 8.5.1 Building sustainability, developing leadership
 - 8.5.2 Creating a peaceful environment
 - 8.5.3 Greening the campus: the *Living classroom*
 - 8.5.4 Student: *Green Earth* Club
 - 8.5.5 A carbon-neutral campus
 - 8.5.6 Creating community through work and play
 - 8.5.7 A peculiar hockey match
 - 8.5.8 A sustainable professional practice
 - 8.5.9 *Coasties united*
 - 8.5.10 North/South solidarity
 - 8.5.10.1 Volunteers working on campus
 - 8.5.10.2 Raising funds

9. Reflections on the path to sustainability

101

- 9.1 Understanding a local context through its specific needs
- 9.2 Assessing the experience

10. Concluding remarks

111

Works cited

In reality, all educational facilities, or simply campuses, should, by definition, be sustainable. This is why it is quite contradictory that a space meant for the education of human beings is also home to a series of practices that go against people's health, the local economy, natural environment and general expressions of life.

Unfortunately, most campuses in Mexico are known for their daunting, leaky cement buildings – lacking green spaces, cafeterias, food cooperatives or potable water fit for consumption by the campus community – where fast food is sold and served in Styrofoam containers, paper wasted and electricity squandered in a generally unsafe environment.

This is the type of situation in which a school should be clear about its *raison d'être*, and about the type of training teachers need to help students reach their full potential as critical and analytical members of society, aware of and engaged with their ability to make history. However, we are constantly running into inconsistencies. Syllabi and programs of study often lack the content and strategies necessary for students to comprehend and transform their reality, to

take care of themselves, others and their natural surroundings in which life flourishes.

This is what has brought us to specify what we mean by campuses that are *green, sustainable, clean* and of *quality*. It is also what has made us seek out strategies to achieve what should already be elemental, that an educational facility – in terms of its facilities, organizational structure, teaching staff, curricular content and everyday practices – be a living example to follow by those whom it serves, be they preschoolers, adolescents, young adults in university, adults or seniors.

Sharing Our Knowledge to Create Sustainable Campuses represents an effort that ultimately aims to get schools to be as they should be, to take back their core mission and be the seedbeds that cultivate and reproduce the experiences and lessons that help one take care of and enjoy the most remarkable thing we have: life in all its shapes, forms and meanings.

A sustainable educational institution protects life, water and energy and avoids creating waste. It incorporates environmental content into its curriculum, stri-

ves for equity and social justice. It generates spaces in which people and nature can mutually thrive, with the ultimate goal of instilling a sense of leadership in a campus community whose work is not without happiness, tranquility, hope and organization. This text proposes strategies to the campus community (principals, teachers, students, parents, and administrative and maintenance personnel) to plan, operate, evaluate, systematize and disseminate environmental management practices. In this sense, the institution can help to prevent and solve pressing environmental issues on a local level.

Environmental management in schools is a bid that aims to ensure that the environmental aspect becomes a hub through which the educational institution's substantial functions are articulated. It also offers ways forward in designing, planning, organizing, evaluating, systematizing and disseminating the campus community's work, which can then be part of concrete collective actions for the environment.

It is an effort that seeks to foment institutional development, community participation, teacher training focused on improving the environmental aspect in

schools, as well as the incorporation of environmental education across the curriculum.

The richness of this publication stems from its collective nature, comprising various institutions and individuals from Mexico and Canada that came together to participate in *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability*. The project included the campus communities of Dawson College (Montréal), the *Escuela Particular Normal Superior Lic. Benito Juárez* (the Benito Juárez Private Teachers' College located in the State of Morelos) and the Cuernavaca, Ayala and Galeana campuses of the *Universidad Pedagógica Nacional* (National University of Pedagogy, also in Morelos) in a process of participatory research that fostered mutual support and learning about the ways to transform institutions into sustainable spaces, in the hopes of inspiring others to journey down the same path, mindful of the fact that there are still many avenues left to explore. The present volume offers experiences lived, lessons learned and tools developed for accompanying future explorations..

1

Let's talk about environmental education

Environmental education is a complex field of knowledge and practices bringing together a wide array of theoretical and methodological approaches, perspectives and articulations. It is also under constant construction and renewal. It is a process through which individuals and communities produce knowledge and cultivate capacities, outlooks and values to both understand and help solve environmental issues (Maldonado 2010).

Its purpose is to contribute to the progressive transformation of the ways in which we deal with natural resources, as well as interpersonal relations, in which sustainability and social equity are part and parcel. It is a tool, with both critical and constructive capabilities, to help achieve sustainable development.

The goal of environmental education should be to strive for sustainable ways of living, by:

- Integrating an interdisciplinary methodological approach
- Creating and strengthening a sense of ethics that promotes respect for life and articulates a renewed worldview in which a harmonious, long-term relationship between humanity and nature is a prevailing value
- Raising the level of awareness in society vis-à-vis the complexity and gravity of social-environmental issues, in such a way that these issues are neither taken lightly nor perceived as despairing.
- Providing conceptual and practical tools that allow both individuals and underserved communities to further their political and social engagement by formulating proposals for sustainable development.
- Disseminating specific knowledge and



alternatives that allow individuals and groups to adopt new outlooks and technologies conducive to sustainable development

- Helping strengthen already existing links of solidarity and mutual respect between diverse social groups, in a framework of economic justice that actively seeks to sever the ties that bind poverty and environmental degradation
- Inciting communities to take ownership of their own development.
- Promoting the the development of critical thinking skills

Sustainability-oriented environmental education can make a curriculum more engaging. However, the main challenge has been finding ways to incorporate the environmental element in the context of schools – a process that has developed slowly, as it implies an ethical, conceptual and methodological renewal.

Notwithstanding, environmental education is fundamental in moving towards sustainable human development and indispensable in making decisions related to environmental management. It also constitutes a tool for encouraging environmentally friendly attitudes and orienting actions that provide solutions to the environmental issues being addressed. It aims to provide political training for social actors involved in the promotion and defence of an equitable distribution

Notwithstanding, environmental education is fundamental in moving towards sustainable human development and indispensable in making decisions relative to environmental management. It also constitutes a tool for encouraging environmentally-friendly attitudes and orienting actions that provide solutions to the environmental issues being addressed

of wealth, social justice and a democratic model underpinned by communities that struggle day to day for the right to improve their quality of life and build a healthy environment. This type of education also aspires to foment tolerance and coexistence by way of dialogue, bringing together knowledge and praxis concerned with tackling environmental issues.

Critical approaches to education should collaborate in restructuring the educational system and its ways of teaching and learning by transdisciplinarily linking the environment with other global issues (population, peace, human rights, gender, social equity, etc.), as well as by integrating spirituality, dialogue among different members of society and emotions into educational processes.

At a sustainable campus, environmental education is crucial. The goal is not only to try to understand the state of the environment, but also to transform it. To that end, the integration of environmental education into the curriculum is linked to the everyday operations and life of the institution, establishing a dynamic relationship between theory and practice in which the reassessment of our own behaviour generates knowledge and learning that, in turn, encourage us to take action. behaviour generates knowledge and learning that, in turn, encourage us to take action.



2

Let's talk about environmental management in schools

Environmental management in schools is a process that helps bring about the necessary changes that facilitate the institutional and pedagogical procedures intended to improve quality of life as well as the environment. In order to carry out this process, it is important to plan, execute, administrate and lead actions from the perspective of environmental education.

Environmental management in schools works to include forms of sustainability in the training of students and teachers, community participation and incorporation of the tenets of environmental education across the curriculum.

In order to promote the transition to sustainability, it is important first to promote social participation, a fundamental aspect of working to improve our environment. By social participation, we mean working together to face a given situation as a coordinated effort.

Schools are fertile ground for promoting social participation and developing a culture of coming to consensus, reconciliation and agreement. This also includes the fostering of conflict management, prioritizing the common good over personal interests, generating dialogue among different types of knowledge and building alliances between people and their government, for their collective benefit as well as that of the environment.

As spaces that bring together different social actors with the express and generally recognized purpose of providing education to the public, schools also lend themselves to the implementation processes of community self-management. In effect, the environment makes the possibility of bolstering social participation and community self-management even more viable due to its global nature. Since all living beings on the planet are vulnerable to the effects of the climate crisis, the need and desire to overcome this crisis can generate hope and provide the impetus to prevail.

3

Building bridges: Methodological strategies

Environmental education should prompt students to “think alternatively” and approach environmental issues and their potential solutions interdisciplinarily (Garda 1994). It should also help develop critical thinking skills, which implies devising educational and pedagogical strategies that encourage students’ participation in dialogue and decision-making. The latter requires that they develop autonomous and innovative thinking, as well as the ability to analyze, discern, assess and deliberate (Novo 1998).

Similarly, environmental education should encourage students’ creativity in seeking out innovative and viable solutions to different issues. Thinking on long- and medium-term bases, as well as envisaging future scenarios, will enable students to deal with uncertainty and chance in their work. In this context, tea-

chers act as mediators between information, resources and materials in order to aid students’ understanding of environmental issues, linking it to their everyday lives and surroundings, and get them involved in concrete actions (Novo 1998).

In the lead-up to this scenario, it is crucial to reorient pedagogical strategies so that they allow students to develop complex, creative and critical thinking skills, alongside democratic participation and collective knowledge production that facilitate responsible decision-making. This entails devising educational strategies to elaborate “a scenario of action based on an appraisal of the certainties and uncertainties, the probabilities and improbabilities of the situation. The scenario may and must be modified according to information gathered along the way and hazards, mishaps or good fortune encountered” (Morin 2001).

To do so means having dialogue between diverse social actors, building educational and learning communities, and fostering both the uncovering and articulation of issues for subsequent research projects.

One of the strategies is project-based learning, which “focuses on a problem to solve by way of a plan. The main idea is to come up with a proposal in which students identify the who, what, where, when, why, how and how much, as well as possible risk factors, alternative strategies to ensure success, desired outcomes...” (Galeana 2009).

This strategy makes it possible to integrate different skills, concepts and standpoints into efforts undertaken to solve problems. It is important to ground the issue in question or problem to solve in a conceptual and procedural framework that helps students understand in their social and cultural context what needs to be resolved. In this type of intervention there are two key aspects to take into consideration:

1. There must be a solution to a problem.
2. There must be a final product, be it a thesis, a report, a model or a design (Helie, et al., 2006).

Project-based learning opens the door to:

- Approaching different areas of knowledge from a holistic perspective.
- Advocating awareness and respect

for other cultures, languages and people.

- Developing empathy towards others.
- Establishing working relationships with people of diverse backgrounds.
- Promoting interdisciplinary scholarship.
- Facilitating research skills.
- Providing tools and methodologies to efficiently learn new things (Galeana 2009).

In this context, the teachers play the role of facilitator of knowledge, allowing for dialogue and inciting discussion. They also encourage students to use information and theory in a critical and relevant manner, think for themselves and take stances vis-à-vis the situations they face and the knowledge they have acquired.

As such, action research integrates scientific research with social action, allowing for the acquisition of knowledge, the development of skills (such as those related to observation and analysis), awareness and participation in social development, as well as the transformation of outlooks and behaviours (Novo 1998).

In sum, the methodology used in environmental education should enable participants to problematize and further their connection to the environment, carry out a complex and critical reading of the reality in question and develop professional skills based on the principles of sustainability.



4

Lines of action to support environmental management in schools

Discerning what the issues are should be the starting point in the implementation of environmental management in schools. Once the problems to be tackled are identified, it is helpful to lay out a clear set of objectives, in other words, to articulate desired outcomes through lines of action and predetermined, verifiable benchmarks. Moreover, the lines of action chosen should respond to environmental priorities on both a local and global scale.

For more participatory environmental management, lines of action should be grounded in the issues identified and lay out the first steps to be taken by the campus community.

In order to meet the benchmarks set out, it is important to organize activi-

ties, secure resources, assign responsibilities, and specify deadlines and desired finished products and outcomes. This can also be aided by laying out a set of indicators to measure the extent of environmental management efforts at a given point in time.

How can groups organize themselves in order to set environmental management in motion? One of the most basic principles of school-based environmental management is social participation. That is, social participation brought about by a core group of members from the campus community. Notwithstanding, the projects initiated by this core group may have far greater reach and impact if it manages to establish connections, alliances and common ground with other social actors that have similar goals.

5

Let's talk about sustainability

5.1 WHAT IS SUSTAINABILITY?

The concept of sustainability became common currency in 1987, when the Brundtland Report posited the idea of “sustainable development” as a reconceptualization of progress and its desired outcomes. It was presented as a type of development that can “meet the needs of the present generation without compromising the ability of future generations to meet their own needs.” Moreover, it stated that economic growth cannot ignore the limitations of nature and natural resources, and that progress is more than just an economic factor. The social fabric and survival of future generations also matter.

There cannot be progress without clean air, biodiversity and clean water for all. Progress cannot go hand in hand with inequality. Much has been written about sustainable development, including nu-

merous critiques on how it is a last-ditch effort to revive an economic model based on exploitation of natural resources and the most marginalized among us.

However, it is up to each and every student, professor and member of the campus community to determine how they define sustainability.

“Sustainability means to live in the present while imagining a future in which all living beings can have a place to call home – to have a healthy world, full of peace, love, justice and liberty” (Yarida Ávila, student at the National University of Pedagogy – Ayala).

“Sustainability is a way to appropriately use the resources all around us – like water, sunlight, wind, forests and grasslands – maintaining and caring for

them as best as we can, so as to meet the needs of human beings and lay the groundwork for future actions. This implies social aspects like maintaining customs and traditions where you live – in your country, school or home” (Azucena Morales, student at Benito Juárez Teachers’ College).

“The term sustainability has a connotation that is all about the environment. But it is also about the social and the economy. They are not only equally im-

portant, but they work together. Sustainability is about the three working together. Without community you can’t have sustainable spaces” (Dylan Davies, student at Dawson College).

The transition to sustainability implies learning to take care of ourselves as people, families and societies, and as one of the many species that calls planet Earth home.





6

6.1 WHAT IS A SUSTAINABLE CAMPUS?

“A sustainable campus is one that has achieved a reduction of its ecological footprint well beyond standards and has done so with an institutional ethos that advocates for justice, peace, respect and action to protect the integrity of natural systems and demonstrates an open willingness to share this information beyond its own walls, wherever it’s needed” (Chris Adam, Coordinator of Sustainable Dawson).

“A sustainable campus is a space in which the community can learn and gradually develop a culture of sustainability and stewardship of natural resources” (Luisa Montes, Sustainability Coordinator at Benito Juárez Teachers’ College).

“It’s a space where we learn about sustainability and apply that knowledge directly to the space itself. It’s a spa-

ce that serves as an example for other campuses, in terms of infrastructure, and internal policy and regulations regarding what we consume and what we do there” (Yarida Ávila, student at the National University of Pedagogy – Ayala).

The actions and practices undertaken in an educational facility as part of its commitment to sustainability are directly linked to the way in which the campus community defines what a sustainable campus is. In the framework of the project *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability*, participating institutions expressed what they understood by sustainability, which was the project’s end goal. We decided to share some of those conceptualiza-



tions in this book, as a way of encouraging those who are interested in working towards a sustainable campus to come up with and share their own definitions, both personally and collectively, that are part of what brings them to take action on their campus.

“Sustainability was a far-off notion for me. Although I was undoubtedly interested, it was not at all clear to me what that would mean in my local context.

“Then one day, I serendipitously came across a project aiming to create sustainable campuses, seemingly out of nowhere, like a playful butterfly fluttering around my hands. At first I thought it would keep its distance and instead opt for a safer place; but no, it landed right on me and invited me to get closer.

“I decided to accept the challenge and join an experienced team willing to share their success with others. A door was opened for me, so I took a few cautious steps inside. Before I knew it, I came to realize that sustainability is an invitation to effect change and raise awareness. This is what I found fascinating about it, that my everyday activities can contribute to the safekeeping of natural resources; a lot of what I already do is sustainable, which made me realize that this does hit close to home and that I am willing and able to invest my energy into sustainability. This is how I began to see the things around me in a new light, hear what used to be noise as sound, taste and appreciate new flavours I would not have before, feel with a more sensitive and closer touch, pick up on certain aromas and scents that the daily resurgence of life has to offer.

“I saw that it is possible, not always easy, but possible. There’s an inner desire in each and every one of us that we often ignore. But it is there, and is part innate, natural, loving and tangible and also intangible. So, I was able to see that others around me were taking my hand and guiding me – teachers, students, coworkers, experts, amateurs, researchers, both young and old, men and women, boys and girls; green, red and yellow plants, as well as animals, air, water, earth, wind, cold, heat, in sum: life, the natural setting to which we belong.

“There’s a transformation inherent to this process, this experience where the challenge is to create a sustainable

campus that starts from the exchange of learning experiences, which may not always be positive but nonetheless always teach you something. In this transformation, like any other metamorphosis, the process is sometimes painful, risking what one has without a guaranteed return. The advantage is that it always entails change, and that in itself is a reward” (Luisa Montes).

6.2 NECESSARY STEPS IN THE REALIZATION OF A SUSTAINABLE CAMPUS

One of the current challenges in education is to respond to the environmental crisis that we are facing as a world community. It is important, therefore, that sustainable campuses are able to provide an education that not only acknowledges and adequately explains this crisis but also seeks to transform it.

Building sustainability requires diversity, work, will and ability from all members of the campus community, as well as an understanding of different points of view. This tests the endurance of students, teachers, researchers, administration and support staff, as well as the surrounding community.

Each campus can and must define its own way to sustainability, which is why we decided to share some ideas and strategies on diverse aspects that can help guide a campus towards its goal and be a tool to facilitate the process.

6.3 CONCEPT MAPPING AS A TOOL IN THE DESIGNING OF A SUSTAINABLE CAMPUS

One of the potential tools in the construction of a sustainable campus, as we understand it, is a concept map. A concept map provides groups with a gra-



phic representation of the development of collective knowledge and creates a network of concepts connected with linking words or phrases.

To come to a collective understanding of what a sustainable campus would look like, we recommend that participants represent the most diverse cross section of the campus community as possible. This will enable them to come up with a broader and more inclusive working definition and can be an opportunity to collectively imagine what type of change is desired.

In order to develop a concept map, someone should first be designated to facilitate the process. The facilitator should encourage the participation of all group members in a climate of openness where all contributions are welcome. It also helps to have a set of questions designed to stimulate brainstorming. One of the most important tasks of the facilitator is to map out ideas as they emerge, which can be done on an easel pad or chalkboard.

“A sustainable campus is a space in which the community can learn and gradually develop a culture of sustainability and stewardship of natural resources”

(Luisa Montes, Sustainability Coordinator at Benito Juárez Teachers College).

Our advice is to write ‘Sustainable campus’ in the centre of the diagram, then sketch out a map with the answers to the following questions, as well as any others that the group comes up with:

- Who is part of the campus community?
- Who is participating in the creation of a sustainable campus (SC)? In what way?
- What would an SC look like for each one of you?
- What does one do in a SC?
- What would it have? or not have?
- What spaces are part of an SC?
- What would you ideally like to see in your SC?
- What challenges do you think this SC will face?

One must remember that while these questions are being answered and discussed by the group, the facilitator should try to write down ideas as accurately as possible in order to later systematize them.

In the framework of the course Herramientas y estrategias para crear un plantel educativo sustentable (Tools and strategies for creating a sustainable campus), we formed two teams, each of which made their own concept map and later presented it to the larger group. From the presentations came a general concept map that combined common elements.



6.3.1 ESTABLISH INSTITUTIONAL SUSTAINABILITY POLICIES

An institution must be firmly committed to sustainability in order to take steps towards making this goal a reality. The administration must adopt policies designed to achieve sustainability and integrate this into its mission and plans of action. This step helps get things started on solid and fertile ground so that the sustainability initiatives that members of the campus community take on flourish.

In general, establishing institutional policies helps avoid a situation in which reaching predetermined goals depends upon individuals' willpower.

Actions that can be taken to institutio-

nalize sustainability on campus may include the following:

- Laying out policies that establish the institution's commitment to transition to sustainability.
- Establishing sustainability-related objectives in the institution's plan of action.
- Making sure that specific sustainability-oriented tasks are assigned, if necessary, by hiring a coordinator charged with encouraging and fomenting actions oriented towards the campus's goals.
- Establishing organizing bodies (committees, contingents, clubs, councils, etc.) that are diverse and represen-



tative of the members of the campus community.

6.3.1.1 An example of sustainable policies: The case of Dawson College

Institutional policies lay a solid foundation on which the campus community can carry out its various activities, projects and programs related to sustainability.

They make it possible to locate sustainability as part of all other operations and establish a more long-term commitment with goals and benchmarks.

At Dawson College, one of the first steps taken to establish its institutional sustainability program, Sustainable Dawson, was to develop a sustainability policy. The initiative, with its definition of sustainability based on that of the Brundtland Report, was brought forth by Sustainable Dawson's coordinating committee. The policy was then

submitted to and later reviewed by the College's Board of Governors, which approved it in 2008.

A sustainability policy does not guarantee that the facility will take the necessary steps towards sustainability. However, it does establish favourable conditions for sustainability initiatives to take hold. It is also important to note that not all postsecondary educational institutions are able to establish policies outside of the hierarchical structures that govern them. In these types of cases, changes have to be implemented throughout the different decision-making bodies.

As an example, we decided to share a model resolution, while reiterating that each institution should establish its own policy based on its members' vision of sustainability, as well as its particular sociocultural and environmental context.



Dawson College Sustainability Policy:

Sustainability is defined as meeting the needs of the present generation without compromising the ability of future ones to meet their own needs (Brundtland, 1987). It incorporates the values of ecological integrity, social equity and economic viability, recognizing that they are connected and interdependent.

Resolution

Given the legitimacy and broad acceptance of the concept and practice of sustainability as a critical 21st century value;

Given Dawson's mission as an educational institution to maintain standards of academic excellence essential to our students' future success;

Given the environmental impact generated by an institution of Dawson's size;
The College has a two-fold responsibility:
To act as an ecologically and socially res-

ponsible agent;

To advance academically the understanding, research on, and teaching of sustainability;

Therefore, on the advice of Senate, the Board of Governors of Dawson College adopts the following:

Dawson College Sustainability Policy.

Dawson shall implement and maintain a College-wide sustainability management plan;

Dawson shall develop simple and measurable sustainability benchmarks and performance indicators;

Dawson shall promote environmental literacy to the College community and, when appropriate, as part of College programs of study and courses;

The administration shall provide the Dawson Board of Governors with a sustainability report and action plan at least once per year;

The Dawson Board of Governors mandates the Director General to strike a Sustainability Steering Committee that will, in consultation with College management, provide guidance for the implementation of the sustainability policy;

The Dawson College Sustainability Policy shall be reviewed by the Steering Committee once every three years, unless otherwise warranted, with appropriate recommendations concerning the policy proposed to Senate and the Board of Governors

6.3.2 MAKE CHANGES TO FACILITIES AND INFRASTRUCTURE ON CAMPUS

Another step is to discern the environmental impact, or footprint, of the facility's operations. This requires physical intervention in the infrastructure of the campus in order to increase efficiency and reduce usage of natural resources. One way to determine the environmental impact is by analysing how water, electricity, soil and garbage are used and handled. For example, is there sufficient access to these resources, are they being over-consumed, and can that consumption be reduced?

The adoption of alternative technologies can reduce the environmental impact of the facility's operations, and the effi-



cient use of energy, water and other resources as well as the reduction of waste are areas in which a campus could work towards sustainability. The implementation of these changes can serve as a tool to foment action for the conservation and propagation of biodiversity, and the protection of ecosystems, so that nature and the campus community coexist in the spaces they share.

Suggested areas of intervention:

- Water usage on campus
- Rainwater harvesting
- Water-saving devices in bathroom sinks
- Energy usage on campus
- Energy-saving light bulbs
- Motion sensors
- Use of renewable energy such as solar panels, solar cookers, etc.
- Use of energy-generating bicycles
- Waste management
- Use of biodegradable products
- Soap water filters
- Dry toilets
- Compost
- Recycling
- Soil and green space management
- Use of organic pesticides
- Organic, medicinal and flower gardens
- Reforestation of native species
- Green roofs and walls

6.3.3 ENVIRONMENTALIZE THE CURRICULUM AND RESEARCH

Postsecondary educational facilities possess the best sustainability instrument in their *raison d'être*: the generating and sharing of knowledge.



Transitioning towards sustainability on campus means educating to understand and transform the environmental and social challenges we are facing today. There are many ways to start, such as by incorporating environmental content in the curriculum or promoting joint student-teacher sustainability research. Making changes to the curriculum can be a difficult step to take, depending on institutional bureaucracy. However, there are other strategies that can make meaningful contributions, such as disseminating information on environmental issues or organizing and participating in forums, meetings and conferences that address these concerns.

Therefore, at a sustainable campus, the community could learn and generate environmental concepts through the study of curricular content, reflection, analysis and transformation of their own reality. At the same time, it can carry out practical applications designed to save and efficiently use natural resources like



electricity, water, and paper. Such applications serve to identify and safeguard biodiversity through observation, experimentation, systematization and familiarization with the cycles of life. This is also reinforced by pedagogical strategies that aim to foment the reproduction of these practices in students', teachers', staff members' and visitors' homes and communities.

The transition to sustainability requires structural changes in the economic, political and social sectors, and environmental education plays an important part in this challenge.

The environmentalization of the curriculum is a process that often results in producing professionals committed to sustainability. The process implies integrating aspects of the environment all throughout program curricula, as well as initiating school-based environmental management, so that the entire campus community can bear witness to the usage of environmental criteria in the running of their institutions.

The inclusion of the environment as a core aspect of the curriculum seeks to

further instill a sense of education in action. An integrated curriculum resignifies education and constitutes a meeting point, bringing together science and other disciplines that advocate for a more complex study of reality.

"The challenge is enormous, in terms of structuring curricula, as it is not only the combination of material or content that must be taught, but also the form in which civility, the laws of matter, mathematics and life itself is taught with a deeper connection to the world" (Leff 2013; 47).

The challenge for educational institutions goes beyond merely incorporating the environmental aspect into its day-to-day operations. It implies the restructuring and resignification of knowledge, which, in turn, requires a paradigm shift in the actions taken. This implies transformation in several different areas:

a) Institutional environment

Educational institutions that foster sustainability must also promote an interdisciplinary work model, redefine how they teach and train teachers, foment research in line with sustainability, incorporate systems of environmental management and gear their work towards meeting society's current needs. It is crucial that each institution enact policies in which sustainability is central to its operations.

Whether or not a project is feasible will depend on the indispensable financial, human and material resources to ensure that sustainability permeates all le-

vels of the institution.

Institutions should facilitate the creation of interdisciplinary sustainability working groups, encourage research that seeks to transform the relationship between society and nature, and contribute to preventing and solving environmental issues, while bringing research and teaching closer together. In doing so, the following recommendations may prove useful:

- Strengthen the project's institutional base.
- Make sure resources are allocated to the project.
- Nominate coordinators who will see the project through.
- Design an organizational structure at the institution.
- Ensure coordination between other such campuses.

b) Programs of study and curricula

Program curricula must include content, strategies, methodology and activities that allow students to acquire the skills necessary to identify and respond to social and environmental issues. Pedagogically speaking, this means taking into account what the complexity paradigm has to offer and fostering systemic thinking that opens up complex perspectives on reality and incorporates approaches, methods and techniques that can innovate existing practices.

The work required to complete a degree – theses, dissertations, reports on practical experience (internships, practicums, etc.) – can serve to strengthen and evaluate the environmental aspect in education, since it allows students to reflect, analyse, research, articulate and put forth proposals related to sustainability.

c) Teacher training

Before and during the process of environmentalization, group meetings should be held among colleagues and/or faculties of each participating institution to get to know professors' motivations and willingness to participate in the process, prior knowledge of environmental topics and view on the need to transform the curriculum. Another important aspect is to draw up a strategy for ongoing teacher training that provides the conceptual, ethical and methodological principles of environmental education.

The connection between the institution and the community is essential. Engaging with one's immediate surroundings makes it possible to carry out projects that benefit the community, as well as promoting action research that helps bring together theory and practice.

d) Institutional collaboration

Another area of potential is in the creation of inter-university networks, given the experience gained, capacity built around project management, and the government support secured by each institution. This is likely to come together if environmental concerns are

integrated into the diverse sectors of the institution's operations, which is promoted in Mexican federal and state governments, such as Morelos. It should be noted that in at least two participating campuses (the Ayala and Galeana campuses of the National University of Pedagogy), for the first time they are implementing projects administered by students, which is an important accomplishment for them to maintain and for others to replicate.

e) Staying connected with the community

Educational institutions should open their doors to the community, maintain constant communication and identify lines of action that include community members alongside students and teachers. This can prove beneficial for the community and, at the same time, allow students to merge theory and practice, broaden their knowledge and develop social awareness. There were many of these types of interactions during the project, through civil society organizations, which will likely become more frequent.

Moreover, it is important for each institutional to organize cultural, informational, outreach and recreational activities aimed at bringing environmental education to the community. This will likely become more of a concerted effort, due in part to the audio-visual programming that the Benito Juárez Teachers' College, one of the participating institutions, broadcasts on the internet.

f) Securing resources and material

Institutions should have a program to secure pedagogical resources that aid in the development of materials needed for the process. There is evidence of this having worked on a small scale, and could therefore be implemented on a larger scale if institutions work together.

6.3.3.1 An example of an environmentalized curriculum: The case of UJAT

In the *Universidad Juárez Autónoma de Tabasco's* (Juárez Autonomous University of Tabasco or UJAT) mission statement, the university makes clear its commitment to meaningfully contribute to sustainable development in Mexico, with particular interest in the State of Tabasco.

The mission statement emphasises research, and the production and application of knowledge in the field of environmental education as a pathway to sustainability. It also seeks to provide citizens with an environmental education that is both solid and imbued with solidarity, based on equality and pluralism in the broadest sense, and values that aim to have a positive impact on people's behaviour and their relationship with nature.

UJAT's Institutional Development Plan instituted a Conservation and Reasonable Use of Natural Resources Training Program tasked with fomenting knowledge, respect and a culture of environmental conservation and sustainable development of natural resources among students. However, an alternative program is also needed, similar to the institutional one in question, that works toward a sus-

tainable future for the entire community and also complements the work already being done for the sake of the environment.

One important step in promoting change for the environment in postsecondary institutions has been the passing of the Sustainable Development Action Plan by the Mexican Association of University and Postsecondary Institutions in 2000. The plan seeks to organically foment the participation of these institutions in analysing, solving and preventing environmental issues, as well as envisage future scenarios on the state of the environment and development through strategic research, teaching, outreach and continuing education.

The current curricular reform, with its more flexible approach, has made environmental education possible in universities by providing basic obligatory course material in all undergraduate programs, like that on *Environmental Culture*. Moreover, several programs include courses such as *Environmental Education*, *Sustainable Development*, *Environmental Legislation*, and *Human Rights*, which are part of the environmental element outlined in this plan.

The Department of Economics and Administration began incorporating course material like Ecodevelopment in 1988 and has since been organizing an Environmental and Sustainable Development Week event. The accounting program boasts course material on Environmental Accounting, the Master of Administration includes environmental aspects in its social marketing course, and the Master of Public Administration includes a course

on regional development in its program, which incorporates aspects of sustainable development.

In addition, the campus community has also held sporadic tree-planting campaigns and organized the *Aula digna* (Respectable classroom) program, which focuses on waste management inside the classroom. Lastly, in many of the Departments, both undergraduate and graduate students alike have chosen to write their theses on topics related to the environment.

Certificate program

In 2002, the Juárez Autonomous University of Tabasco began to offer the Regional Certificate in Environmental Education for Sustainability, founded as a means of establishing credentials for those who are interested and successfully complete the program.

The program aims to train people that are committed to their surroundings and able to be a driving force in environmental education for sustainable development. The program is designed to provide theoretical, conceptual and methodological tools so that graduates can have an impact on sustainable policies and practices.

The groups that have formed out of this program are often diverse, including students from different disciplines, teachers working at different levels of education, and representatives from civil society organizations and various governmental bodies.

7

What to care for on a sustainable campus

**"I asked for all things so
that I might enjoy life, I was
given life so that I might
enjoy all things."**

(Unknown)

7.1 CARING FOR LIFE

We human beings are on this earth to be happy. Life is a gift, an opportunity. To stay alive we need other living beings that coexist in the natural environment in which we are born, grow up, procreate and die; an environment which we experience with our counterparts, where we share our joys and sorrows, where we play, work, rest, dream and struggle to make our dreams come true.

From the cradle of our infancy to the grave in which we are laid to rest, from the food that gives us energy each day to the heat used to prepare it; each article of clothing, each piece of material used to construct our home we owe to other forms of life and elements on our planet.

In a microscopic organism, a fungus, a plant, the resin of a tree, the venom of a

rattlesnake or a scorpion, one may find the cure to a disease. This is why it is important to become familiar with, value, conserve and promote biodiversity.

7.1.1 What is biodiversity?

Biodiversity, or biological diversity, refers to the immense variety of living beings – from microorganisms to plants and fungi, as well as those enormous animals that have evolved naturally over millions of years. The term also refers to the different ecosystems, which constitute the physical space or home in which living organisms live and interact.

We human beings are part of this grand biological diversity, and we depend on it to attend to our basic needs, such as food, health, and those related to the essence of being human, like the creative, social and spiritual capacities that make us different



from other living species. In that sense, we can see many of the benefits of biodiversity reflected in the following spheres of human existence:

Food

As a result of biodiversity, we are able to nourish ourselves from a variety of fungi, fruits, vegetables, nuts, grains, insects, fish, mammals, birds, reptiles, and many other sources.

Health

Many diseases owe their cure to the immense diversity of living organisms. Bee, snake and scorpion venoms are used to make antidotes for insect bites, and even treat certain types of cancer, “Currently, between 65 and 85% of the world’s population bases their medical

treatments on medicinal plants” (Conterras MacBeth, 2010:50). Vaccines, antibiotics, antivirals, anti-inflammatories, analgesics and antifungals are examples of items used to prevent and relieve ailments that are derived from a wide variety of living organisms.

Housing

Throughout history, human beings have turned to natural resources to build places to live. Palm leaves, bamboo and wood are some of those natural construction materials used.

Clothing

Likewise, human beings have used natural elements to make their clothing and footwear. Examples of these materials include cotton, linen, silk, animal skins and feathers.

Culture

Human beings’ creative and artistic capacity has been expressed in different cultures through the use of natural elements. Musical instruments have been made from conch and gourd shells, seeds, animal skins, jawbones and tree trunks.

Outfits for dancing, acting and rituals have been made out of feathers, silk and vegetable pigments.

The social, economic, cultural and recreational activities in which we human beings engage are also linked to biodiversity. Such activities include fishing,

ecotourism, ranching, music, dancing or painting.

Biodiversity generates other indirect benefits, often known as ecosystem services, which include :

- Natural water harvesting: forests and rainforests absorb rainfall, thus allowing aquifers to be replenished.
- Forests, rainforests and oceans absorb carbon dioxide and greenhouse gases, turning them into oxygen.
- Microorganisms in the soil make it more fertile and productive.
- Green spaces help to stabilize the climate.

7.1.2 What's going on with our planet's biodiversity?

Human activity on Earth has contributed to the changing of ecosystems, leading to the appearance of new species and, unfortunately, the disappearance of others.

One might think that losing one of the many species out there would not in itself affect life on this planet. It does, however. If we are adequately informed and aware of the importance of each species on Earth, we can then appreciate the value of protecting them.

The mere disappearance of one species has a major impact on the whole planet. This is why it is troubling that many spe-

cies have already been lost, are threatened or endangered.

Knowing the numbers can help us see the richness of biodiversity and understand the magnitude of the problem that is its degradation and loss for the planet. For example, the incredible biodiversity, in Mexico make it one of the leading countries in variety of species and ecosystems. We should be proud of this. At the same time, the loss of biodiversity should make us worried and take action to stop the damage we are causing due to our way of life (or death?).

Knowledge of this natural richness helps us value, care for, protect and enjoy it. To give an example from ecologist Contreras MacBeth (2010, 49), fungi are a species whose function spans the entire ecosystem. They thrive on wood, soil, plants and manure. In the State of Morelos, there are 550 types of fungi on record, 80 of which are edible; clavitos, tree mushrooms, trompas, escobitas are used in desserts, soups, tamales, ceviche, pozole, salads and quesadillas. Communities in Morelos have incorporated this rich biodiversity in their gastronomy. There are up to 84 different mushroom-based recipes, which have been featured in gastronomical and regional fairs. For many women's groups, student groups and small businesses, mushrooms have become a key source of income.

The *Universidad Autónoma del Estado de Morelos* (Autonomous University of the State of Morelos) has played an important part in the research, dissemination

The majority of species we interact with constitute a source of life, a source of wealth that gives us the ability to take care of needs as basis as food, health, housing and clothing. It also gives us the ability to live fuller lives by enjoying the many natural landscapes . . .

and circulation of technology designed to raise awareness of and appreciation for local mushrooms, their protection and propagation. This has had an impact even beyond the State of Morelos.

With the rich biodiversity in our state, we can do all this and much more!

7.1.3 Why are we losing biodiversity?

Climate change affects all living beings on Earth by modifying the environment in which they live. Many species have had to migrate in order to adapt and survive, and they have not always done so successfully.

Loss of habitat arises from human intervention that alters the homes of living beings by using the foundation of ecosystems for urbanization and activities related to tourism, agriculture,

livestock and industry.

Overuse consists of removing a given species from its natural environment at a rate that is greater than that at which it can normally reproduce itself.

Pollution is the result of an increase in chemical substances in the environment, the accumulation of trash from human activities – also producing excess noise, heat and light – and the presence of genetically modified foods that physically alter the environment (the water, land and air) and the species that live within it.

7.1.4 How can we protect biodiversity on campus?

The great variety of species with which we interact constitutes a source of life and wealth that enables us to meet our basic needs: food, health, housing and clothing. It also allows us to live rich sensory lives as we enjoy the many natural landscapes with their plethora of colours, aromas, tastes, sounds and mysteries to discover.

We human beings are only a part of this immense diversity of species and, of course, the only ones to be aware of it. This brings with it the tremendous responsibility of caring for it.

Once we are aware of our situations a global community regarding the loss of biodiversity, we must take action to change it from the spaces we inhabit in our everyday lives.



A large part of our time is spent at school, where we are not only students but also consumers of paper, food and beverages; where we use the facilities and therefore use water and energy, such as gas and electricity. When on campus, we leave our footprint by generating trash, consuming large quantities of paper and water – each time we go to the bathroom, clean the facilities, water green spaces – which we also pollute by disposing chemical and biological waste from laboratories or from the health centre, or after using paint, solvents, waterproofing and other maintenance products.

On campuses where smoking is permitted, the footprint left by smokers includes the smoke itself as well as cigarette butts. In one way or another, all of these actions affect biodiversity because they alter the environment and impede, limit or restrict the conditions that otherwise make life possible.

7.1.5 Educational tools for caring for biodiversity on campus

7.1.5.1 Short stories

Short stories, much like storytelling in general, can be used as an educational tool to help us reflect on the importance of appreciating and protecting biodiversity as well as other environmental issues.

They can be read aloud, discussed or acted out (with finger puppets, marionettes or life-size figures). They can also be used as the basis for illustrations that refer back to the issues suggested by the group.

As an example, we present a short story by Chilean writer Saúl Schkolnik (2012), whose work invites us to think about the impact that the extinction of a bird can have, in spite of its seeming insignificance.

Why you should not kill a dodo

On the small mountainous island of Mauritius in the Indian Ocean, around 1660, there lived a weaver famous for the quality of his rugs and hats. Nobody ever found out the secret to his weaving techniques – nobody, that is, except me. And since Bert the weaver, died many years ago, I think I can now tell you.

Mauritius is an island where very skinny palm trees grow. And it was from their small, egg-sized coconuts – with their hard, thick shells covered with a fibrous husk – that our weaver got what he needed for the job.

“Theresa,” he would say to his wife, “let’s go see if the crabs left behind their nests.”

“All right, Bert, let’s go,” she would reply, and they both would go down to the beach and start rummaging through orchid plants at the base of the palm trees.

You’re probably asking yourself what do Birgo crabs’ nests have to do with Bert’s weaving? ... Let’s let him tell us.

“Here’s my secret, Theresa,” he said while collecting crabs’ nests. “The crabs remove the fibre covering the coconuts and soften them into smooth threads, which they use to make their nests.”

“And you use those smooth threads instead of the coarse coconut fibre to make your products,” said Theresa, admiring his cleverness.

“That’s right,” he answered back proudly.

During the spring, the beach came alive with red orchids, and honeyeaters – little birds that darted back and forth drinking the nectar of flowers.

What Bert and Theresa did not know was that the honeyeaters, aside from drinking their nectar, pollinated the orchids too; as they drank they got pollen all over their heads and transported it from flower to flower. The orchid seeds would fall in the cracks of tree trunks and then new plants would sprout from the sand. At the same time, the honeyeaters would make their nests in the younger palm trees, as they didn’t like the rough leaves on the older ones.

Then one day Theresa asked: “What would we do without the palm trees?”

“It’s best not to even think about it”—answered Bert—“Without the palm trees, we would have no coconuts, or crabs’ nests. Better not to even think about it.”

But then there were the dodos!

“Bert... Bert!” shouted Theresa whenever she caught sight of one. “There’s another one of those blasted birds...”

And Bert, armed with a whip, would go out, chase down the bird and flog it to death.

Maybe you’re wondering why Bert would actually kill them. It’s because the dodos would gulp down the coconuts that the weaver so desperately needed.

The turkey-sized, pigeon-like, flightless birds would run and run, but since

they were clumsy and heavy, Bert would always catch up.

But one day...

All of a sudden there were no more dodos. Bert had killed them all. There were no more left. Now nobody would eat that ever-so-precious palm fruit. The problem had been solved

"Finally," said Bert to his wife, "there's nothing to worry about anymore. The dodos are all gone."

Poor Bert! He had no idea what was really going on.

A year went by, and everything seemed the same as always. But there was one thing that caught Theresa's eye.

"Did you notice, Bert, there are no palm sprouts this year?"

"Why are you worried if there are so many palm trees out there?" asked the weaver.

The following year the same thing happened – not one new palm sprout. Bert and Theresa were both a little worried, but since there were so many palm trees, they soon forgot about this strange occurrence.

And now I'll tell you a secret that neither Bert nor his wife ever found out.

I know why there were no new palm trees, or rather, why the palm trees were disappearing. As the old ones died off they weren't being replaced by new ones. There were no new palm trees because there were no more dodos.

Normally the coconuts fall to the ground and after some time, as you might imagine, the embryo inside turns into a root. The root grows and—pop! —it breaks through the shell and digs into the sand and—boing!—a small green stem reaches upward. After a few years, another great big palm tree's leaves will be blowing in the ocean breeze.

Bert thought that, like always, this is what would occur. "The coconuts are there, but I don't understand why they won't sprout," he exclaimed, incensed by the situation.

But the palm trees on the island of Mauritius were a different species. Their coconuts, as you might have guessed, had shells as hard as wood; hard as it tried, the root just couldn't break through... and not one palm tree had sprouted.

But the dodo... that little glutton... remember that the dodo gulped down the small coconuts?

I'll now tell you what neither Bert nor Theresa failed to realize.

The coconut would simply pass through the dodo's digestive tract where its strong muscles and digestive juices would soften the tough shell, without destroying it. Then, the coconuts would be expelled with the rest of the undigested food, lying once again in the sand.

Only then—pop!—the root would break through the now softened shell and dig into the sand and—boing!—a small green stem would reach upward, and soon after would turn into another beautiful palm

tree.

As you can see, it was the dodo, upon swallowing the coconuts, that allowed the palm trees to reproduce. The dodo's disappearance thus meant no more new palm trees. Nevertheless, it was the third year when things started to take a turn for the worst...

"I haven't seen a single honeyeater this spring," said Theresa to her husband.

"You're right, Theresa," said Bert. "Well, they should definitely be back next year."

Bert didn't realize that they weren't coming back. You already know that they made their nests in the palm trees that were no more than two years old... and since there were no young palm trees left, the birds simply went elsewhere. But when the honeyeaters left, no other creature was left to pollinate the orchids. And the following year there were no more orchids. Nor were there Birgo crab nests, as the crabs couldn't find the plants to make

them in. In the fourth year, when Bert and Theresa went down to the beach to gather up crabs' nests for their smooth fibre, they couldn't find any.

"Bert," said Theresa, with fear in her voice. "What happened? We haven't found a single crab's nest."

"You're right, honey, and this is really bad. My products won't be the same. They won't be as smooth or as beautiful as before."

"And people aren't going to buy your rugs or hats anymore," replied Theresa, who was now crying.

"What happened?" they both asked each other, without knowing that they were the ones to blame for their own misfortune, for killing off the dodos.

They didn't know; they had no way of knowing. But you know. So if you ever see one yourself, which would be quite difficult, you'll know why you shouldn't kill a dodo.



Reading this short story is a way of learning and raising awareness on the importance of each species that lives on this planet and, in turn, the value of protecting all species.

If the dodo's extinction had such an impact, what would be the consequence of losing other living beings?

7.1.5.2 Storytelling

The following example is a story aimed to make us think about the effects of climate change (Hurtado 2010).

Rafa, an indigenous teacher from the State of Morelos, told us about what happened to the Yauhtli marigold flower

Flowerless, scentless vans

When I was in high school, eight or ten years ago, I remember when I would leave town in a transport van at 6 am during the marigold season. The van would fill up, literally. It would fill to the brim with ayates sacks replete with marigold flowers, and we would travel with that fresh scent around us. When we got out of the van, even our clothes had the smell of marigolds.

Several vans would fill up like that, from the first one at 5 am – at that time there were already people waiting in the main square – and people would pile in to find a space. If not, they would just wait for the next one, which would also fill up with anxious people shouting, “Off to Cuernavaca we go! “More vans would soon follow around five in all, with people pushing to get into these vehicles filled with marigolds – the same marigolds used to

make the flower crosses you see downtown and in the four corners of milpas to scare away the devil on the Feast of Saint Michael.

Nowadays, only a handful of older women make the trip to then sell the flowers. The season comes later, and the production has gone down considerably to what it once was; the ayate sacks carry mostly dirt, and with a bit of willpower, you can still see some of the pretty little flowers.

This story reminds us of how climate change is damaging the economic prospects of families – especially of women –and culture, as certain traditions are lost. Climate change has also affected the landscape: where there were once fields of Yauhtli, there is now cement.

7.1.5.3 Our Living Neighbours

In order to care for the biodiversity on campus, it is important to acknowledge the value and meaning it has in our lives and for the planet. It is also important to believe that one can make a difference if we act in tandem with the rest of the campus community.

And since we can't take care of what we don't know we have to start by getting up close to the living beings that share the same spaces as we do in our everyday lives, in order to get to know who they are, what they do and with whom or what they interact.

Sharing experiences

In one of the sustainability-focused campuses, the working group came up with a

good idea on how to articulate its efforts in a down-to-earth way. After successfully putting the idea into practice, it was transformed into a methodological proposal entitled *Our Green Neighbours* – or, more inclusively, *Our Living Neighbours*. Here we present the proposal for possible use in other campuses.

Our Living Neighbours (Julio Mora)

Introduction

In coming to know an object we can contemplate, analyse, feel and perceive it better. As we get up close to it, we can visualize, size and compare it, give it a semantic value and, therefore, a level of importance. At this point, it transcends being an object and becomes something with value and meaning, especially in regard to living beings, such as humans, plants and animals.

This is what inspired us to implement the project, *Our Living Neighbours*. We began with the assumption that we only see these objects, but we do not look at or reflect upon them. We know they are there because we see them every day at school or at work. Out of the corner of our eye, we catch a quick glimpse here and there when walking to the classroom or office. They become more noticeable during the rainy season when they display their bright colours, and they hide away on the weekends, on their own, taking care of our shared dwelling.

They are our neighbours, and they live with us in the same building. Much like in modern twenty-first century urbanized societies, that is all our neighbours

are: beings whom we know are there and all around us but with whom we are not acquainted personally. If we were to meet them, get to know who they are, what they like and what they do, we would surely give them a different place and value in our lives.

Methodological aspects

General objectives

This activity sets out to raise awareness and bring people closer to the living things that coexist in our shared spaces at school or at work in order to get to know, recognize, value and protect them. Digital images created by members belonging to the same campus community will be used in this activity.

Pedagogical aims

- Generate the necessary motivation for participants to take on sustainability projects with optimism and delight.
- Ensure participants gain an understanding of their surroundings in order to strengthen their moral character and willingness to work toward the common good.
- Create an atmosphere of reflection that promotes building social bonds among participants.

The original idea was to work solely with digital photographs. However, paintings, drawings, sculptures, collages and other forms of art can be easily integrated.

Throughout the project, as interest

in the importance of acknowledging and giving meaning to 'living beings' is strengthened, so too will the content and environmental subject matter be strengthened. The same holds true for including these activities in lesson plans and curricula in both formal and informal education.

Procedure

In order to make the project work efficiently, three working groups are needed, each with a specific set of tasks, focuses and responsibilities, and one for each step. Participants in one working group are welcome to contribute to the activities of the others.

Step 1 (team formation)

The objective of this step is to get the campus community involved in the activity. The original name of the initiative was *Our Green Neighbours*, but some schools, wishing to include both the animal and plant species living on site, broadened the name to *Our Living Neighbours*.

When assembling the team, at least one or two members of the school community – students, professors, researchers service or administrative staff – should participate.

Once the team has been assembled, members should get to know each other a bit, come to an agreement on a set of goals and an agenda with benchmarks, and then appoint people to each activity.



Basically, in this step, team members will define and develop a strategy for getting the campus community involved. They will also gather together the digital material for their presentations and secure the resources needed to carry out activities. This entails choosing who will participate, what the format and length of events will be, what will be photographed, drawn, painted or sculpted, who will select the best pieces, where the event will take place, etc.

Step 2 (exhibition):

This is perhaps the most noteworthy part of the activity. This does not, however, mean that the other parts are any less important. Rather, the exhibition is what will determine whether or not the activity achieves its goals.

The purpose is for the material on display to be sufficiently aesthetic in quality to encourage spectators to get to know, recognize, value, try to preserve, and even propagate the "living neighbour" that is being represented artistically. The exhibition should also be held in a space that

can accommodate the largest number of visitors possible.

During the exhibition, information should also be provided on the main goals of the event. Although the activity may well be one of the school's regular cultural initiatives, it should be seen as inciting participation within the broader context of a school-wide, holistic sustainability project.

During the exhibition, information should also be provided on the main goals of the event. Although the activity may well be one of the school's regular cultural initiatives, it should be seen as inciting participation within the broader context of a school-wide, holistic sustainability project.

Step 3 (dissemination)

The team in charge of this step plays an essential role throughout the whole process by working simultaneously and in parallel with all the activities. The team designs, edits, prints and distributes the event information in order to attract as many participants as possible.

The team plays a vital role in design and strategic outreach (print media, e-mail, web sites, social media, etc.) so that the invitation reaches the entire community. Its main task should be to ensure the biggest crowd possible attends the event.

In our experience, some educational facilities have auctioned off the individual pieces inaugurated at the exhibition. This allowed us to recover the money spent in setting up and curating the exhibition, which made

the activity economically sustainable. In some instances, we were even able to get funding for our activities.

Finally, it is good idea to carry out a debriefing of the entire process once the activity is over, taking into account such elements as: what went on, what we learned, what we plan to continue doing, and how we plan to disseminate our work.

The objective here is to provide a methodological description of an activity that we carried out successfully. To be sure, the unique qualities of each campus, in terms of educational level and local context, will only help to enrich the project's strategies and objectives. Have a great exhibition!

7.1.5.4 Making an inventory of biodiversity on campus

Once we know who our green, living neighbours are, our next step is to become better acquainted with them, by getting to know their names, characteristics and roles they play in nature. One recommended way of doing so would be to take an inventory of the fungi, plants and animals on campus.

Your campus can follow the guide here that we are sharing with you. After identifying your green neighbours, it is quite surprising what else you can discover when making a biodiversity inventory.

How to make a biodiversity inventory

The ultimate goal of making an inventory of the biodiversity on campus is to identify the living species that are there. In so doing, we gain access to information,





raise awareness and become motivated to care for all forms of life that we are responsible for protecting.

Gathering as much information as possible about plants, animals and fungi is in itself an important act.

Instructions:

When carrying out such a project, be sure to keep detailed, well-organized records of the data collected and of the process itself.

What do you need for the inventory?

- Comfortable clothes and footwear suitable for the terrain.
- A camera or video camera, if possible (these can be cellular phones, iPads or professional-grade equipment)
- Writing/drawing tools (pad and/or computer, pens, pencils and/or colour pencils)

- Measuring tape.
- Gloves and gardening shears.
- A keen sense of wonderment!

How do you carry out the inventory?

For a considerably large campus, it is better to assign teams to different areas or proceed step by step so the job does not become too overwhelming. Also, decision-making should be inclusive and is best carried out by assigning tasks to different roles: note taker, photographer (videographer, if possible), timekeeper and several people who will do the grunt work by measuring, cutting and calculating.

Photos should be taken of each species found. When observing species, you must take into consideration as many characteristics as possible. In the case of plants and fungi, you should observe their general appearance, abundance, size (width, height, circumference and

diameter), colour, whether or not they have seeds, flowers, fruit, sprouts (little ones). You can also describe in general their habitat. Let yourself be amazed! There are places where the climate is so favourable to life that plants even sprout from the walls and pavement.

If people in the group know the scientific or common name of a species, jot that down. If not, this information can be found from photos, videos, drawings and descriptions on the internet or with the help of specialists who can either take part in the inventory or go over the records obtained to further complete them.

What should you do with all the information?

- Build a data base that can be periodically updated.
- Hold exhibitions of photographs, drawings and sculptures.
- Make videos out of the material collected.
- Publish (or contribute to existing publications that already include) material biodiversity.
- Paint a mural or make a sculpture showing the 'biodiversity on our campus'.
- Design educational pamphlets, posters, postcards, dividers, puzzles or notebooks, luck or memory-based educational games, sketches for the

radio, TV, internet or theatre (which can be acted out with finger puppets, marionettes or life-size figures)

- Share these materials with other campuses or with a wider audience through radio or TV programs, traveling exhibitions, the internet and social media, and by holding public events .
- Try out any other heart-felt idea that comes to mind !

Having a biodiversity inventory allows you to measure your campus's carbon footprint and to work on protecting and propagating existing species. It is one way of mitigating climate change by enabling more greenhouse gases to be captured.

For example, if we introduce or increase the number of species that consume less water, such as cacti, we are taking a concrete step to adapt to climate change. In every campus in Morelos that participated in the Sustainable Campuses Project (SCP), we initiated a program to propagate and care for species of cacti after learning that this national symbol not only consumes less water but also resists climate change due to its considerable potential to capture carbon dioxide.

All in all, if there is one thing we can say about having completed a biodiversity inventory, it is that we counted what counts! And, naturally, one of the things we counted was you...

During the course *Tools and Strategies for Creating a Sustainable Campus*, we carried out a biodiversity inventory led by

Chris Adam from Dawson College. It was a rewarding experience where we were amazed to learn of the sheer number of plant species living on campus that go unnoticed by most of us. Participants from other schools were eager to complete an inventory for their campuses. Shortly thereafter, one of our group members carried out an inventory with children from the summer program at the National University of Pedagogy's Galeana campus. This rewarding experience made it clear that one of our most important achievements has been the propagation of our own learning experiences in other locations.

7.1.5.5 Inviting even more neighbours: bees and butterflies

A sustainable campus should not only seek to document and protect its biodiversity. It should also strive to attract or increase the population of certain species by creating favourable conditions for them to live and reproduce. At Dawson College in Montreal, it was precisely this kind of initiative that was undertaken as part of the *Peace Garden* project, to which we will subsequently turn.

Attracting bees

Mason bees are solitary pollinating insects that, unlike other bees, do not live in colonies. The females seek out a small hole in a tree or hollow stem to lay their eggs. Once they find one, they gather up flower pollen and nectar and put it in the hole. Then they lay their eggs inside and cover them up with mud. The females produce one to two eggs per day during the spring and, in

that sense, go on laying their eggs in the little holes forming multiple layers, or cells: egg, pollen, mud, then egg, pollen, mud again in succession. The bee larvae start to hatch and feed off of the pollen until they are ready for the next stage, in which they build a cocoon all while inside a closed-off cell. The bees become adults toward the end of the summer and remain inside their cells throughout the winter, only to come out in the spring and repeat the cycle. The males come out first, followed by the females shortly thereafter. After they mate, the males die.

The loss of the mason bees' natural nests, due to increased suburbanization, is an issue. Therefore, in order to coax them back to Dawson College's campus (located in an urban setting), students made small holes in the trunks of the trees at the Peace Garden – trunks that were damaged and had to be cut down. This has created a zone for the bees to gather pollen and build their nests.

Students from the biology, environmental science and leadership training programs used the bees as an example of a species that needs a modest helping hand. In doing so, they were also able to study the insect's life cycle and raise awareness in the campus community.

Learning from a most beautiful neighbour: The monarch butterfly

The campus community at Dawson College is part of a program that strives to protect and propagate the monarch butterfly by working to help its offspring thrive. Also noteworthy is that this pro-



gram is integrated into different classes from Dawson College's programs in Community Recreation and Leadership Training, Environmental Science, Biology and Social Sciences.

Members of the campus community feed the caterpillars and observe them as they transform from emerald-coloured chrysalises to a beautiful orange butterflies. Then, the monarchs are tagged and set free in the Peace Garden, where they feed until they are ready to make the long journey that will bring them all the way to the Mexican mountaintops.

Monarch butterflies are a species that do not recognize geopolitical boundaries or the political economies that impact their environment. However, all of these social phenomena affect the butterflies' rate of survival in their trip down south.

A monarch in the curriculum

Being the beautiful border-crossing traveler that it is, the monarch is an emblematic species that has been used for teaching courses in environmental geography, biology and graphic design. In these courses, the butterfly has continued its metamorphosis and become part of the core curriculum, manifesting itself in themes such as the need for cooperation between countries, biodiversity, climate change and biodiversity proliferation. The monarch has also served as a source of inspiration for artistic creation and as a topic of communication in video production.

This project has facilitated learning and the sharing of knowledge among members of the campus community – including maintenance workers and administrative staff – some of whom

became teachers on the subject when their curious colleagues came to see the caterpillar's transformation. As a space where knowledge and learning experiences were exchanged, it also helped to create an environment of harmonious coexistence with nature in which participants experienced a sense of well-being while contributing to efforts to protect and propagate one of the most beautiful species that lives with us in the global village.

7.2 CARING FOR THE WATER

*It splashes, wets, washes, pours
Water, you come and go
River, froth, rain, fog,
clouds, ice, sea, dew...
Take care of it like it takes care of you.*
Joan Manuel Serrat ("El hombre y el agua")

7.2.1 Where is all that water?

"When I was a child, I would hear a lot of my teachers say that our body was made up of 75% water and would ask myself: 'But where is all that water? Could it be that it starts at the tip of my toes and goes all the way up above my waist?' At that time there was no Google to help me figure it out. And it was only in recent years that I was able to find the answer during a meditation exercise. After some initial relaxation, the wise instructor had us close our eyes and concentrate in order to take a mental journey through the inside of our body and to visualize and feel the presence of water in every part of our organism. We could thus feel the moisture inside our nose, which helps the air we breathe pass in and out; in



our mouth and on our tongue – saliva – which helps us speak, eat and kiss; in our eyes – in the form of tears – to keep them moist and free of impurities... The journey allowed me not only to identify the presence of water within me but also to value how it affects the way we feel when the amount of water in our body drops. Having a dry mouth can leave us unable to speak or eat; a lack of tears can make our eyes burn and make it hard to see, not to mention what happens when we have bad diarrhea with vomiting. It actually brings us closer to death by provoking an imbalance in such vital signs as our heart rate and the functioning of our nervous system.

“Equally dangerous things happen when there is too much water. If our eyes water, it’s also irritating. If we can expel fluids due to a kidney problem, our whole body swells up and our blood pressure increases.

“Understanding how and where the three quarters of water are in my body, and the vital role they play in my health and well-being, helped me understand, comparatively speaking, why the planet has roughly the same amount of water and the importance this has in keeping it healthy. I came to understand that the planet has its own filtering mechanisms, bouts of infection and outbreaks of fever that throw it off balance, just like I do.

“Sustainable water usage means conceiving of water as part of the commons, as a fundamental human right much like the right to life. This is why we must create a culture of appreciation and care in our educational

institutions: three quarters of our bodies and of the planet consist of water. Thanks to the water in my brain, I, Margarita Hurtado Badiola, am aware of my own being and am able to write this text. It’s because of the water on this planet that I’m alive just like those reading this text.

“I now understand how, from a vision of development hinged upon the accumulation of capital, water is considered to be a commodity whose sales ultimately benefit a handful of transnational corporations that unscrupulously hoard, pollute and control it. This is why I think it’s important to be more aware of the situation of water on our planet and take action to transform that situation.”

7.2.2 The water on the planet

We live on an aqueous planet; three quarters of it are made up of water. However, only 0.03% of that water is fresh. In order





to grasp what that means, imagine the entirety of the planet’s water in a domestic bathtub that holds around a thousand litres – one spoonful would be fresh, half would be ice and only a drop would be potable.

These proportions have remained constant for millions of years; what has actually changed is the world population. There are around six billion people that all need water to live.

The problem of water scarcity is becoming even harder to resolve as that drop of potable water is being polluted by human activity, especially by the types of production and consumption inherent to a system centred on the accumulation of wealth in the hands of the few at the expense of large swathes of the population

and of nature. In this context, water has become just another commodity that transnational corporations extract from springs and sell all over the world.

“Man and machine need much more water to function than you would imagine. But once they have it, they degrade it and turn it into an unusable element that contaminates the ground, lakes, rivers and seas” (Chazaro 1999).

Data has given us a clearer picture in terms of the situation of the water throughout the world, in Mexico and in the State of Morelos, specifically. Every year, there is rainfall covering about half a million cubic kilometers, and only around one fourth falls on land. If this water were to fall evenly over land and sea, it would meet the needs of humanity for centuries to come, as fresh water can only be found in large quantities in small areas (rivers, lakes, aquifers, etc.).

Densely populated areas require increasingly more water that is not readily available. It thus needs to be brought in from a considerable distance, which often implies high transport costs and a significant amount of water lost during the transport.

Availability of water throughout the planet

	Percentage water supply	Porcentaje population
North America & Central America	15%	8%
South America	26%	6%
Europe	8%	13%
Africa	11%	13%
Asia	36%	60%
Australia & Oceania	5%	<1%

Water and health

Water that may be available is not always fit for consumption.

1.2 billion people have trouble accessing potable water. Over the next 25 years, two out of three people in the world will struggle just to have enough water for their basic needs. Every eight seconds a child dies from drinking contaminated water. One out of three people in Africa suffers complications from drinking unsafe water.

Water and consumption

The UN recommends the daily consumption of about 50 litres of water per person to cover their basic needs.

In the US, daily rates of consumption are around 250 to 300 litres, whereas in Somalia it is 9 litres. Also, there are about 14 million people who do not have access to water for domestic use.

How is water being used?

Throughout the world	En México
65% for irrigation	83% for irrigation
25% industry	3% industry
10% domestic/ commercial/services	12% domestic/ commercial/services

7.2.3 Water in Mexico

As populations grow and urban centres expand, so too does the need for clean drinking water. However, this need is not always met, considering that 16.5% of

the population lacks potable water.

To better illustrate the data that will follow, we should bear in mind that a cubic metre of water, in millilitres, comes out to roughly the amount of water that can be held in a domestic bathtub.

In 1950, there were 17 742 m3 of water available for 29 million inhabitants, whereas by 2007, there were 4312 m3 for a population of 105 million. Forecasts for 2020 suggest that there will be 3500 m3 of water for approximately 125 million people.

7.2.4 Water in Morelos

The availability of water in the State of Morelos, in spite of what most people think, is lower than the national average.

Between 2001 and 2006, the national average was 4900m3 whereas in Morelos is was 3120m3 and, according to projections, might decrease by 30 percent within 25 years.

Different areas with different water-related problems:

Huitzilac, Tepoztlán, Tlalnepantla and Totolapan – the municipalities with the highest rate of precipitation – have a serious problem with rainwater retention, due to rapid water infiltration that causes streams to form in the middle and lower zones of the towns. The issue is that these zones then become contaminated, as wastewater gets mixed in with the rushing water polluting ravines and rivers. In fact only 23% of wastewater is treated in urban area and 4% in rural zones, thus

worsening the pollution.

In terms of how treated wastewater is used, 82% is designated for agriculture, 16% for public use in urban areas and a mere 2% for industry.

Lastly, according to the *Comisión Estatal del Agua* (State Water Board), 149 000 inhabitants (approximately 8%) do not have access to potable water services, 45% of whom live in urban centres and 55% in rural zones.

7.2.5 How to implement sustainable water practices on campus

Once the situation of the water on campus and its immediate surroundings is understood, people will surely be motivated to act and transform it as part of a general strategy of caring for life in all its shapes and forms.

Rather than feeling hopeless, the gravity and magnitude of the problem at hand should prompt us to take individual and collective action, however small, with the hope that our work will have an impact on our surroundings and that this impact will reverberate far and wide.

But, how can one implement sustainable water practices on campus? The first step is to become familiar with the situation of the water in and around the facility and then to think about what can be done to help care for this collective recourse. This should be done by setting an example and by adopting educational strategies that promote best practices within the campus community as a whole to be implemented

Un manejo sustentable del agua, supone concebirla como un bien común, como un derecho humano fundamental como la esencia de vida, por eso desde los planteles educativos, debemos generar una cultura de valoración y cuidado...

in our homes and in our work for sustainability.

The guide that follows can be used to develop an evaluation that charts the course for subsequent plans of action. Ideally, this evaluation should be done collectively with different members of the campus community. Teams of guardians, caretakers, rangers or however else they would like to be called can be formed, including students, teachers, administrative and maintenance staff, and parents willing to care for the campus's water. Together the team can come up with answers to the questions posed in the guide, as well as other questions that stem from your specific context.

7.2.6 Campus water evaluation guide

- Does our campus have enough water?
- Where does it come from?
- How does it get here?

- What do we use it for?
 - What is the quality of the water on campus?
 - ¿Scarce?, ¿arrive by batches?
 - Do we have tanks or other water storage systems? If so, what kind?
 - Does it need to be pumped?
 - What do we do when there is no water?
 - If we get our water from tanker trucks, how much do we buy and how much do we spend on it?
 - Are there water leaks in the facilities? What is the nature of these leaks?
 - How is water disposed of? Where does grey, or soapy, water go? And blackwater? Water from laboratories? Is this water treated and is there a system in place to make use of the treated water?
 - Is rainwater harvested? If so, how?
 - Are there dry toilets and/or urinals?
 - Is water used for irrigation? How are green spaces watered?
 - Are there drinking fountains? If so, what type and is there quality control of the water they dispense?
 - Are there water coolers? If so, are they for the entire campus community? Who pays for them and how much? What brand of water is used? What is the water served in? Do the coolers also dispense hot water? Does the school sell bottled water as well? How much of it does it sell on a yearly basis? How many empty bottles does it generate and what does it do with those plastic bottles? Has the campus community shifted toward reusing water bottles?
 - Are there institutional policies to regulate how water is consumed, saved and cared for on campus?
 - Are there any campaigns in place to help protect water? Are there any regular rituals, dances, traditions or festivals carried out in order to value and respect the water on campus, or in community members' hometowns, in which students, teachers and staff play a role?
 - Are there any bodies of water on the premises or nearby? If so, what is it and what condition is it in? Does the school take advantage of it, take care of it or contribute to its contamination?
 - Are there any committees, working groups or staff responsible for taking care of the water on campus? If so, what do they do?
 - Are topics related to water addressed in the institution's curricula, programs, courses or research?
- Once all of these questions from the guide have been answered, you will have a solid foundation from which to identify priority efforts and design a corresponding plan of action.

The results of the evaluation can be shared with the rest of the campus community through in newspaper articles, murals, posters, social media, radio broadcasts, theatrical performances, newsletters, ceremonies and other communicational strategies. When presenting the information, attendees could be given the chance formulate proposals for action, thus inviting the community to participate.

7.2.7 Best practices for caring for the water on campus

7.2.7.1 Benito Juárez Private Teachers College's Living Water Project

"I'm thirsty for that water," said the little prince.

"Let me drink some..."

*And I understood what he'd been looking for!
I raised the bucket to his lips. He drank, eyes closed.*

It was as sweet as a feast. That water was more than merely a drink. It was born of our walk beneath the stars, of the song of the pulley, of the effort of my arms. It did the heart good, like a present.

—The Little Prince

In July, 2012, our school began a project known as *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability*. The initiative had the support and amicable participation of Sustainable Dawson, a group based at a Canadian college with six years of experience in this long but decisive journey. Our project was also supported by the concurrent and committed efforts of the National University of Pedagogy in Morelos, at its three campuses in Cuernavaca,

Galeana and Ayala.

During discussions on the best direction for our institution to take, we rallied behind two projects: *Agua viva* (Living water) and *Aula viva* (Living classroom), the first of which concerns us here.

Such a project in a teacher training institution can have a far-reaching impact due to its potential to multiply through the teachers' professional practice. It is also an occasion to create a new culture based on the generosity of this vital resource. *Living Water* aims to rekindle the mysticism of this natural element, handed down to us by our pre-Hispanic ancestors, by reclaiming the figure of water as part of the Earth's interior and spirit.

The ancient Mexicans conceived of this inner, spiritual aspect of water as the Earth's lifeblood, the water nahual, able to transform its body and face. It is a cloud, a raindrop, a blanket of snow. It is mud, frost and rainbow.

Water, as many pre-Hispanic cultures in Mexico thought, is a snake that is carried by the wind. It is able to reach down to the depths and come back up only to touch the sky and form springs, streams, lakes, rivers and seas in the fulfillment of its important mission on Earth.

The *Living Water* project's main objective is to reclaim the value of water as a gift given to us by nature, a common resource we all have the right to enjoy. With the aim of making these proposals a reality, the campus invested resources to design and install a filtered drinking fountain



tonnes of carbon dioxide (CO₂). Three litres of water are wasted to produce only one litre of bottled water (Agua virtual). A total of 3.6 billion plastic bottles are used daily in North America, and only one out of every six bottles is recycled. In order to produce and transport plastic bottles for the approximately two billion litres of water consumed every year in Canada, three million barrels of oil are used. Furthermore, multinational corporations purchase groundwater and hold onto the rights to its distribution – an example of how the basic right to potable water is being privatized.

What was the campaign's main strategy?

Club members set up an information table in one of the hallways on campus, in an area with a lot of foot traffic from students, professors and staff alike. They would ask people that came by: How much do you know about bottled water? Then, they would hand them a short questionnaire to find out how

much visitors really knew about it.

At the table students also collected signatures for a petition calling for the school cafeteria to stop selling bottled water.

One of the campaign's achievements was that it managed to garner considerable support from students, teachers and staff who signed a pledge not to consume bottled water so long as there was potable drinking water on campus.

Another strategy involved taking all the water bottles, caps and labels thrown away in one day on campus and using them to decorate the information table. With the slogan "This is what Dawson consumes," club members displayed all the plastic bottles discarded on campus every day.

Later on in the campaign, club members made plant holders from discarded plastic bottles to be used for green walls as one way of showing how the bottles could be reused on campus.

7.3 CARING FOR ENERGY

Human beings have always used natural resources that provide energy, such the sun, the wind and water. These types of energy are there, irrespective of whether or not they are used, for this reason these renewable sources are considered to be green energy.

For centuries, renewable energy sources were basically the only type used:

human or animal work, watermill, wind-mills, and firewood for heat.

7.3.1 What is energy? Uses, types and alternative energies

Energy is a key concept in science. Most basically defined, it is the ability of objects to carry out work, a given motion or a particular action. In other words, the amount of energy contained in an object is measured by the work it can carry out.

The physical world has demonstrated that energy, as a unique phenomenon, can manifest itself in many different forms capable of transforming from one form to another.

What is energy used for?

Since the middle of the eighteenth century, with the advent of the Industrial Revolution, energy usage has become more and more intense. Humankind has consumed more energy over the last two centuries than it has in its entire history. As a result, pollution has grown worse and resources have been depleted, given that most energy consumed comes from non-renewable sources.

Currently, developed countries are major consumers of energy, whether for industrial, domestic or recreational use. However, much of the population in developing countries still uses traditional sources of energy. Energy consumption



per person is actually one of the indicators used to measure the level of development between countries or within the same country.

Most resources used to produce energy in major energy-consuming countries come primarily from poorer countries that have a much lower rate of energy consumption. Particularly paradoxical about the situation is that if these poor countries had the same rate of energy consumption, the depletion of natural resources would accelerate exponentially. Major transnational corporations exploit or control the energy-producing resources in countries that do not have the economic means to finance their own development, thereby creating a situation where poorer countries are financing the development of wealthier ones.

What types of energy are there?

There are many types of energy that come from different sources. Some energy can even generate other types of energy. For example, electrical energy can generate light, thermal, mechanical, sound and radiant energy. Currently, out of all the energy consumed throughout the world, 85% comes from burning fossil fuels, 6% from burning biomass, 6% from nuclear sources and 3% from hydroelectric sources.

Alternative energies

The massive consumption of non-renewable sources of energy (coal, oil, natural gas and uranium) makes it clear that renewable, non-polluting energy

sources would be a better option. These sources consist of solar energy to generate heat (thermal energy) as well as electricity (photovoltaic energy); wind energy; hydropower (from waves, marine currents, rivers and tides) and geothermal energy.

To a lesser extent, kinetic energy – the energy that an object generates through movement – can be used. Kinetic energy depends on the mass and speed of an object, an example of which can be found in activating a motor by pedaling a bicycle or other machines such as blenders, sprinklers, flourmills and water pumps, just to name a few.

7.3.2 Governmental action for energy efficiency

The Mexican government, with the help of the *Comisión Federal de Electricidad* (Federal Electricity Board or CFE), has implemented programs that aim to save energy, thus creating a series of organizations dedicated to that goal. One of these organizations is the non-profit *Fideicomiso para el Ahorro de Energía Eléctrica* (Electrical Energy Efficiency Trust or FIDE), which brings together efforts from the public, civil society, and private sectors to encourage action and programs that help foster a culture of efficient use of this resource.

The mission and vision of the FIDE is based on:

- Using electrical energy efficiently and sustainably.

- Promoting new energy technologies.
- Propagating sustainable energy.
- Strengthening a culture of efficient electrical energy use that, in turn, generates economic, social and economic benefits while drawing on best internal practices with regard to what they promote.



The strategic objectives of the FIDE include the Efficiency and Reasonable Use of Electrical Energy Program, EDUCAREE, which seeks to promote a culture of energy efficiency that directly contributes to sustainable development in community centres, schools, civil society organizations, businesses and international organizations.

One of its main courses of action is to provide pedagogical materials that promote electrical energy efficiency in primary and secondary schools across the country. The materials are provided for free and consist of videos and age-appropriate booklets for student ranging from preschool up though primary, secondary and college levels.

7.3.3 An example of energy efficiency in practice at a sustainable campus

In its efforts towards sustainability, the Benito Juárez Private Teachers' College struck a partnership with the FIDE in which they obtained the following :

- An evaluation of the campus and its facilities by technicians charged with identifying the sources of energy con-

sumption, types of lighting used and possible leaks as well as suggesting ways to save energy.

- A visit from EDUCAREE staff, who gave a presentation and shared teaching strategies on how to integrate the subject of electrical energy use in primary school classes.
- A set of books on the subject of electrical energy explained through illustrated short stories together with suggestions of simple ways to use energy efficiently at home or at school.

The Teachers' College helps to disseminate programs and materials through BJ-Media, an internet-based radio platform that focuses on sharing teaching tools and strategies from EDUCAREE as well as the experiences and results of primary school students in classes where these sustainability practices are applied.

In this sense, by enriching the social work that both institutions do for our children and youth, as well as our natural resources and, by extension, the planet, they mutually support each other propelling their work forward.

Approaching the CFE, becoming familiar with the FIDE and working in tandem with EDUCAREE is the type of strategy that would help any educational facility that is working towards sustainability in their efforts to do so.

Another energy-saving action carried out on campus was the installation of a pedal-powered water pump. The energy generated through human movement, in turn, activated motor that pumped stored, filtered and purified rainwater— so as to be fit for drinking. This water was then made available to the campus community.

7.4 TAKING CARE THAT THERE IS NO GARBAGE

Garbage is any unwanted material or product considered disposable and that needs to be eliminated. It is generated through production and consumption. Garbage does not exist in nature. We humans make it when we turn organic matter (fruit peels, vegetable scraps, etc.) into inorganic matter (glass, paper, plastic, metal, etc.).

Over time, it has become more and more difficult to dispose of solid waste, since the chemical compounds used in producing such waste take longer to biodegrade. For example, milk used to be stored in reusable glass bottles, but today most milk is sold in tetrapak or tetrabrik packaging, made from cardboard, plastic and aluminum. This change in storage container makes it complicated and expensive to recover these materials through recycling.

Our day-to-day activities generate resi-

dual waste, contributing to the millions of tons of garbage that pollute the water, land and air, not to mention creating an unsightly landscape. Depending on our consumption habits, purchasing power and general culture, each person generates an average of 1 kg of garbage per day. In developed countries, the average increases to about 3 kg, whereas in the poorest of countries, it is considerably less than 1 kg. These differences also exist within countries; more developed regions generate more solid waste than less developed regions. In terms of what is discarded, around 50% is organic waste, 32% are objects that could have been recycled, and between 17 and 20% are objects that actually cannot be reused and are therefore sent to sanitary landfills which, unlike open dumps, are built under strict technical guidelines to reduce ground contamination.

The amount of waste we generate has increased so much and dealing with it has become so complicated that we have had to regulate it with different types of laws. These laws aim to prevent accidents and minimize the environmental risk of the waste's final disposal.

7.4.1 Classification of waste

The ultimate disposal of solid waste is subject to the Ley General para la Prevención y Gestión Integral de los Residuos (Prevention and Integral Management of Waste Act or LGPGIR). The law stipulates that waste must be classified in the following categories :

- Solid Urban Waste (SUW)



- Waste Requiring Special Attention (WRSA)
- Hazardous Waste (HW)

The amount of solid urban and special attention waste is directly related to the rate of urbanization, the types and patterns of consumption, family income and lifestyle (OECD, 2013). In Mexico, according to the Diagnóstico Básico para la Gestión Integral de Residuos (Evaluative Parameters for the Integral Management of Waste), we generate 103 thousand tonnes per day – or an average dimensional weight of 153.12 kg/m³ (INECC-CENICA, 2012), which is the equivalent of 672 675 m³ per day. To get an idea of the actual dimensions, imagine a professional soccer field seven stories high. This makes it possible to fill the space 5.44 times over.

Among its many consequences, the inap-

propriate handling of waste can poison animal life, contaminate the soil and the water with leachates, and cause greenhouse gas emissions (when burnt), not to mention all the ensuing health effects. For this reason, the LGPGIR established a set waste management standards that consist of regulatory, operational (guidelines for properly handling waste), financial, planning, administrative, social, educational, monitoring, supervision and evaluative actions for the appropriate handling of waste from the time it is generated to its final disposal. The goal is to create environmental benefits, economic advantages, and social acceptance vis-à-vis the different needs and circumstances of each respective locality or region

7.4.2 Eco-mapping

The implementation of the Integral Management of Waste (IMW) is based on a proper evaluation.

To determine the type of waste being generated and where it is coming from, one must first identify the areas in which the different types of waste are being produced. For this we suggest making an eco-map, a systematic method of environmental evaluation through images.

The procedure is carried out as follows:

- Draw up a map or sketch of the campus and all its installations, including offices, classrooms, libraries, bathrooms, dinning halls and cafeterias, green spaces, sports fields, parking lots, common areas, etc.
- Come up with icons to point out the zones where waste is generated and what kind of waste it is. Remember that SUW and WRSA have the same characteristics, differing

only in their origin and how they are produced. Thus, the same icon could be used (unlike hazardous waste).

- Carry out a tour of the facilities, ideally as a team including other campus community members consisting of students, teachers, administrative and maintenance staff. During the tour, the team should place icons according to the type of waste as they go. The team can also include the type and capacity of containers (bins or cans) used to store it.

The information gathered could be organized in a chart that shows the type of waste generated, its characteristics and how it is stored.

For example :

		Characteristics of the bins		
Nombre del Área	Type of waste (SUW, WRSA, HW)	Amount	Type	Capacity
Offices				
Classrooms				
Auditorium				
Cafeteria				
Library				
Computer room				

La realización de nuestras actividades cotidianas genera residuos (...) cada persona contribuye a la acumulación de millones de toneladas de basura que contamina...

Once the waste-producing areas and the types of waste have been identified, the next step is to determine how the waste is generated and disposed of. The resulting data will then serve as the basis for establishing sustainability strategies on campus.

7.4.3 Doing the math to understand

The following exercise was carried out in three postsecondary institutions (the Benito Juárez Private Teachers College, the Galeana and Ayala campuses of the National University of Pedagogy and Dawson College in Montreal), all of which are part of the project Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability.

Moreover, as a way of broadening the project's outreach, the exercise was carried out with a group of children at a summer program in 2013, organized by one of the above institutions.

The activity consists of conducting a survey of the garbage produced on campus focusing on the amount and how it is disposed of, with the aim of having a sound evaluation, raising awareness about the community's consumption habits and advocating for the creation of sustainable waste management program.

This tool could also be utilized to calculate the amount carbon emissions generated, which contribute to global warming.

How to conduct a garbage survey on campus

The first step is to collect all the garbage generated on campus over a five-day period, beginning on Monday. It is important to do this during ordinary work days so as to have a representative sample of what is produced. It is also good

to carry out the activity several times during the year, so as to have enough data to calculate averages and draw comparisons that paint a clearer picture and offer indicators of the effectiveness of corrective measures taken.

Required materials:

- Gloves (preferably gardening or leather work gloves)
- Surgical or dust mask.
- A reliable scale.
- Containers for the different classifications of waste (plastic, metal, glass, paper, cardboard, organic material and others for waste requiring special attention, such as batteries, bathroom waste and one last container for actual garbage).
- A tarp or sheet of plastic large enough to for all the garbage to fit on top.

Recommended steps:

- Invite members from the various areas of the campus community to participate
- Make sure that all the garbage generated by the institution is brought together.
- Choose an appropriate location to lay out the tarp and garbage.
- Empty the containers of garbage brought together for the activity on the tarp.



- Provide gloves and masks for every participant.
- Classify and sort the garbage into the appropriate containers for plastic, metal, glass, paper, cardboard, organic material, waste requiring special attention, such as batteries, bathroom waste, medical waste and garbage.
- Weigh each type of sorted garbage.
- Multiply the total weight by the number of weeks (or days, depending on the period the team is working with) in the school year. For example, if the team gathered 2 kg of paper per day, multiply that amount by the 200 school days in a year, to yield 400 kg.
- Record the data for later use as indicators of progress.
- End the activity by recovering the waste that can be reused, recycled, sent to wholesale or thrift markets, or be used for compost.

Closing activity:

After concluding the survey, the group should debrief, share observations and answer the following questions: What type of garbage is produced on campus? What does this garbage tell us about our eating habits? What does it indicate about how we use paper? Were there a lot of Styrofoam containers and plastic? Was there a lot of organic matter thrown in the garbage? If so, where does it come from? What can be done to reduce the amount of garbage generated? What can be done to avoid hazardous waste? How did this exercise make you feel? Did you think about the people, including the many boys and girls, who work informally collecting garbage? What other thoughts do you have? Does this exercise motivate you to take action? If so, what kind of action? Would you be willing to undertake a comprehensive waste management program on your campus? While observing all that organic waste generated by the school and how it added to the heap, would you consider composting as an option to reduce garbage?

It may not weigh too much, but it weighs heavily on the planet!

One of the reflections that came out of this exercise was that, although products such as Styrofoam cups and plates weigh almost nothing, they have a major impact on the environment. This is due what it takes to produce them, the time they take to biodegrade and the devastating they cause to marine life when fish die after accidentally eating them, confusing them for food. Although it does not



seem like much, it weighs heavily on the planet.

This activity was an important step on the path to sustainability, as it motivated participants to design and bring to fruition a integral waste management program and, above all, alter their consumption habits for the good of their health, the economy and the place we all call home: planet Earth.

In general, strategies for dealing with garbage focus solely on the operational aspects (classification, collection, centralization, temporary storage, assessment, treatment, transport and final disposal). In this sense, the strategies adopted should be geared towards reducing waste and understanding its value and proper handling through less expensive and more effective means that take into consideration the environmental,



technological, economic, social and procedural aspects.

For example, regulatory norms recommend that an educational institution establish internal regulations on the responsibilities of the campus community with regard to proper waste disposal as previously stipulated and the banning of certain materials such as Styrofoam, plastic bags, etc. on campus.

Operationally speaking, it is important for plans to clearly articulate each step in the process and how they relate to one another. The planning needed is directly related to the amount and type of waste generated within an educational institution and the strategies adopted for dealing with it.

The team will also need to weigh the administrative and financial aspects for disposing waste both traditionally and through implementing the proposed strategies. On the administrative end, aspects to be considered include data

collection on the generation, transport, processing and final disposal of waste on campus, as well as establishing standards and management plans to be presented to government authorities or authorized service providers.

The financial aspect should be considered during the planning phase, in terms of how many financial and human resources are needed to implement the proposed strategies, while not forgetting that investments can be made in several allotments according to priority and order or operations. We recommend using a calendar to help organize the strategies and activities planned.

Finally, regarding the social aspects, it is important to design strategies in accordance with the characteristics of the institution, so as to have the campus community (students, teachers, administrators, support staff and parents) participate in the design, operation, follow up, evaluation, systemization of strategies and dissemination of the results obtained. We recommend designating coordinators to guarantee that tasks are done within the established timeframes and procedures.



8

Where there is poverty, there cannot be sustainability

**"I am a human, and nothing
human is alien to me."**

- Terence

f sustainability is a guarantee on life, both present and future, if strives for the wellbeing of the planet, then poverty will have to be eliminated first in order to achieve this goal. During the project, some of us from the editing team were looking for data on water, on minimum wages, on the availability of health and educational services when, all of a sudden, we were surprised to find out that 8% of the population in Morelos does not have access to potable water. It was jarring to think about that harsh reality that 150 thousand human beings, mostly women and children, are facing, this 8% of individual names and faces that are suffering from a lack of a basic element for survival. This fact has motivated us to take action from our respective campuses to do away with those statistics. So that there is not one human being that suffers for simply being alive.

8.1 WHAT IS POVERTY?

The concept of poverty is most often understood as a situation in which a person does not have adequate access to at least one of the following social indicators :

1. Basic education
2. Health care
3. Social services
4. Quality housing
5. Basic residential services
6. Food

The *Consejo Nacional de Evaluación de la Política de Desarrollo Social* (National Social Development Policy Assessment Council or CONEVAL) defines people



Foto: Raful Pineda Villalobos

as poor if their income is not enough to cover the cost of the goods and services required to meet their needs, both in general and in terms of food.

Extreme poverty is a more severe stage of this condition. It occurs when people cannot meet their basic needs for survival with regard to food, potable water, shelter, clothing and health. According to the World Bank, another indicator is the fact that those who are suffering from extreme poverty live with less than \$1.25 a day.

8.2 POVERTY ON A WORLDWIDE, NATIONAL AND STATE LEVEL

The United Nations Development Pro-

gramme (UNDP) estimates that :

- More than one billion human beings live on less than \$1 a day.
- 448 million children are underweight (weighing less than what is considered healthy).
- 20% of the world's population controls 90% of its wealth.
- One out of five children does not have access to primary education.
- Women earn 25% less than men with the same skillsets.
- 876 million adults are illiterate, of whom two thirds are women.
- Every day, 30 000 children under the age of five die from preventable diseases.
- In developing countries, more than one out of ten children die before the age of five.
- More than one billion people do not have access to clean water.
- In sub-Saharan Africa, close to half of the population does not have access to potable water.
- 2.4 billion people live without access to basic sanitation.
- 2.8 billion people, nearly half of the world's population, live on less than \$2 dollars a day.

If the world's population were scaled

down to 100 people:

- 15 adults would be illiterate, 10 of which would be women.
- The 20 richest would earn 74 times more than those living in poverty.
- 13 would die before the age of 40.
- 15 would be malnourished, 3 of which would be children.
- 22 would not have access to potable water.

Statistics on poverty in Mexico:

According to CONEVAL, in 2010, there were 15.1 million people living in poverty and 12.8 in extreme poverty in Mexico, which represents approximately 46.3 and 11.4 percent of the population. Currently, there are more than 116.9 million people in Mexico (INEGI, 2012), half of whom live in poverty or extreme poverty. In 2008, 47.4% of the population was living in some form of poverty: 18.2% in poverty hindering their access to food (or *food poverty*), 25.1% in poverty hindering their access to education and health care (or *capability poverty*) and 47.4% in poverty hindering their access to clothing, transportation and housing (or *patrimony poverty*).

Poverty affects more people in rural than in urban areas in all three of the above forms: 18.2% live in food poverty, 25.1% in capability poverty and 47.4% in patrimony poverty. In terms of social marginalization, in 2005, out of 2454 municipalities in Mexico, 1254 had a high



Foto: Marco Antonio Rojas Mena

or very high level of marginalization. In general, municipalities with high levels of marginalization and poverty correspond to lower levels on the Human Development Index.

According to the results of the 2008 *Encuesta Nacional de Ingresos y Gastos de los Hogares* (National Household Income and Expense Survey or ENIGH), 25.5% of children and adolescents do not have access to basic foods stuffs, 34% have limited access to health care and education, and 59.5% lack access to housing, transportation and clothing. Children and adolescents, who make up 42.2% of the total Mexican population, are disproportionately affected by poverty and the denial of their basic rights; 51.3% of them live in poverty.



Foto: Marco Antonio Rojas Mena

Minimum wage varies between \$67.29 and \$63.77 pesos (approximately \$5.25 to \$5.50 CAD), depending on which part of the country a person lives in. More than 10 million Mexicans earn the minimum wage or no wage at all (one out of five is unemployed). Half of the 6 million workers that earn less than \$60 pesos a day are women, one quarter of whom are the head of their household with the same proportion having from one to six children.

- 9 million Mexicans do not have potable water.
- 36 million do not have adequate housing, defined by the UN as housing that offers shelter, sanitary conditions, well-being, security, independence and

the possibility of social insertion.

- 1 million 136 833 youths do not have access to education.
- 1.2 million children are malnourished.

Statistics on poverty in Morelos:

In 2010, 43.7% of the total population in the State of Morelos was living in poverty.

In terms of the country's 32 subdivisions, Morelos ranks the 16th highest in poverty and 19th highest in extreme poverty. The minimum wage in Morelos is \$63.77 pesos a day, which would enable one to purchase:

- 1 kg of tortillas (\$14).
- 1 kg of beans (\$17).

- 1 kg of eggs (\$28).
- 1 round trip on public transportation (\$9).

In Mexico, one out of every three workers earns from one to two times the minimum wage. In Morelos, this is true for 22.2% of workers.

- 149 000 people in Morelos do not have access to potable water (amounting to approximately 8.4% of the population)
- 88 000 do not have sewer or sanitation services (approximately 5% of the population).

These numbers lay bare a reality that urgently needs changing. They are the reflection of a humanity that has lost its way, due to the fact that the few live to accumulate wealth by exploiting the many. At the far end of this exploitative equation there is the ever-worsening poverty of women and children.

Poverty does not allow for sustainability. This is why it is essential to strive to eradicate it. Although it is well known that profound, structural change is required, instead of feeling hopeless, this should make us act now in our daily lives, however insignificant it may seem, and keep striving slowly but surely, much like the tortoise that beat the hare.

In this sense, environmental education plays an important role as a transformative agent, and as a tool to educate critical thinkers, aware of and engaged with their ability to make history, so that this

reality is seen as a challenge rather than an insurmountable obstacle.

Social participation is a fundamental aspect in moving towards the realization of alternative forms of human relationships based on social justice and equity, in harmony with their natural surroundings in which life can fully flourish. The processes needed for social participation are difficult and require the creation of spaces in which democracy can play out in day-to-day operations and interactions with family, life partners, neighbours, friends, classmates and coworkers.

As such, educational institutions are fertile ground to implement social participation, exercise democracy and, of course, work towards sustainable ways of living in which poverty is not possible.

The first step in the struggle is to know one's enemy. In doing so, it is important to understand what we mean when we talk about poverty, what its origins and magnitudes are, how it manifests itself, what conditions need to be changed in order to eradicate it, and what is within our power to do at this point in time, without losing sight of the fact that it is a complex phenomenon that will require long-term efforts on a grand scale.

8.3 THE ROLE OF A SUSTAINABLE CAMPUS IN FIGHTING POVERTY

Institutions steeped in hopeful and committed visions of education can and must take action to combat poverty on diffe-

rent fronts. On the academic front, for instance, when environmentalizing or greening the curriculum, poverty can be included as part of course content, perhaps by examining its different aspects across several courses in order to understand its complexity and to design, produce, systematize and disseminate social intervention projects that tackle this issue head on.

Postsecondary educational institutions can develop areas of research, form teams of academics who study the matter from multidisciplinary and interdisciplinary perspectives, become familiar with existing theoretical and conceptual frameworks, conduct case studies, implement projects that incorporate internships and draw on social services, generate new and share existing information, create educational spaces for reflection, analysis, dialogue and exchange of knowledge and experiences (fora, colloquia, conferences, film discussions, informative murals, etc.).

In addition to focusing on the theoretical aspects of poverty, steps can be taken to help train the campus community to undertake transformative actions: workshops, classes, evaluations, collaborative work with other institutions (universities, civil society groups and government bodies that can offer tools to assist in project design), and learning to manage resources needed for operations, evaluation, follow-up, systematization and dissemination. These actions serve as a solid foundation from which we can work towards sustainability.

Considering the importance of *practi-*

cing what one preaches, the first step can very well be an evaluation of poverty on campus. This can be done in many ways including the use of surveys, individual or group interviews, a graffiti mural where campus community members can freely engage with the question, or even through quantitative and qualitative research as a thesis or broader institutional project.

Any one or several of these approaches can help create an assessment that accounts for the situation of poverty on campus and the ways in which the community proposes to tackle it.

8.3.1 Campus poverty evaluation guide

This guide offers a set of questions that can orient an evaluation and help formulate possible intervention projects :

- How would you define poverty?
- Do you think there are community members that live in poverty? If so, what percentage?
- Do you think that poverty affects men and women equally on campus?
- Do you consider poverty to be one of the factors causing students to drop out?
- Do you know of any specific cases of poverty on campus? Can you describe such cases (without divulging any names)?
- Have any classmates or professors done anything to support members of the

campus community living in poverty?

- Does the educational institution itself offer any type of program to support those living in poverty? If so, can you describe it?
- If any such programs have been implemented, what were some of the outcomes?
- Are there any programs outside of the institution (state, federal, international, civil society and/or private businesses) that have been implemented on campus to tackle the issue of poverty? If so, what did they entail and what results were achieved?
- Have there been any studies conducted on poverty at your educational institution? Who conducted them (undergraduate/graduate students, professors, etc.)?
- Are there researchers, or groups of researchers, on campus who focus on the issue of poverty? What work have they done so far?
- Have there been any actions undertaken to get to know or improve the quality of life of the campus community regarding health, nutrition, or finances? Can you describe them? Are they at all part of the curriculum or extracurricular activities? Who proposed them and who promoted them? How did they unfold and what outcomes did they achieve?
- Do you have any suggestions for strategies to combat poverty in your cam-

pus community? We would like to hear them.

8.4 WORKING SO THAT PEOPLE CAN REACH THEIR FULL POTENTIAL

The concept of poverty has an economic connotation. Traditional indicators refer to this aspect by associating it with a person's income and the extent to which they can meet their needs with what they earn. However, while having food, clothing and protection from the elements may aid in survival, it does not guarantee a person's well-being and far from helps them reach their full potential and achieve happiness.

For this reason, authors such as Julio Boltvinik (2005), in his doctoral dissertation *Ampliar la mirada: Un nuevo enfoque de la pobreza y el florecimiento humano* (*Broadening the perspective: A new approach to poverty and the flourishing of human life*), have studied poverty not only as an economic matter but also as a human one. In that sense, Boltvinik posits a conceptual duality: *el ser pobre* (poverty as an existence) and *el estar pobre* (poverty as a condition). Poverty as a condition refers to a lack of basic items (good and services), whereas poverty as an existence is related to not being able to reach one's full potential (in terms of abilities, aspirations and other basic human qualities) due to a lack of social conditions, such as relationships and activities.

To illustrate the difference between poverty as a condition or as an existence, we decided to share with you a text by Armando "Catón" Fuentes Aguirre in which

the distinction is clearly and cleverly made:

"I intend to sue *Fortune* magazine for making me the victim of an inexplicable omission. What happened was that the magazine published a list of the richest men on the planet, and on that list my name was nowhere to be found. You'll find, of course, the Sultan of Brunei, as well as the heirs of Sam Walton and Taikichiro Mori.

"You'll also find the names of personalities like Queen Elizabeth of England, Stavros Niarchos, and Mexicans Carlos Slim and Emilio Azcárraga.

"However, they didn't mention me.

"I'm a very, very rich man. If you don't believe me, see for yourselves: I have my life, but I'm not sure why; I still have my health, and I don't know how.

"I have my family, my loving wife who, in giving me her life has become the best of mine; wonderful kids who haven't given me anything besides happiness; my grandchildren with whom I'm able to enjoy a new, exciting form of parenting.

"I have brothers that are like friends and friends that are like brothers, people that truly love me in spite of my flaws and that I really love in spite of my shortcomings.

"I have four editors to thank each day, as they're able to read well what I write poorly.

"I have a house with many books inside (my wife would say, many books with a house among them).

"I possess a small piece of the world in the form of a garden, which every year gives me apples that would have shortened Adam and Eve's time in paradise even more.

"I have a dog that won't go to sleep until I get home, and welcomes me as if I were the owner of heaven and earth.

"I have eyes that see and ears that hear; feet that walk and hands that touch; a brain that thinks of things that other people have already thought up, but have never occurred to me personally.

"I own the common inheritance of man: happiness to enjoy and suffering to connect with others who suffer.

"And I have faith in God who loves me infinitely.

"How can there be more wealth than what I have?

"Why, then, did *Fortune* not include me on the list of the richest men on the planet?

"And what about you? Do you consider yourself rich or poor?

THERE ARE PEOPLE OUT THERE, THAT ARE SO VERY POOR, THAT THE ONLY THING THEY ACTUALLY HAVE IS MONEY!"

8.5 BEST PRACTICES IN HELPING HUMANS BEINGS THRIVE

In order to achieve sustainability on campus, work should be done to eradicate both poverty as a condition and as an existence



by creating economic alternatives that help human life thrive and reach its full potential. Such sustainability would ensure that every member of the campus community is not only meeting their needs to survive, but is also happy and content with life and with themselves, their friends and their natural surroundings.

As previously stated, poverty is a complicated issue with major structural dimensions and characteristics. In spite of that, no effort to mitigate it should be looked down upon, but rather should inspire and be seen as an example to be replicated and adjusted to fit other contexts. This can act as a learning experience that generates hope and constitutes another step forward to a sustainable campus.

We have already mentioned certain actions undertaken at different campuses to protect biodiversity, water, energy, and for an integral management of waste. These practices directly contribute to efforts to care for the natural environment, and indirectly constitute strategies for combating poverty and in general improving the quality of life of the campus community.

That is, when we plant a vegetable garden or a fruit tree, we are placing alternatives within reach of the campus community so they can produce and consume nutritious, organic and fresh food, and have access to medicinal plants.

All of this can be implemented in one's home and community. By harvesting rainwater and filtering it so that it is drinkable, we are caring for the water on our planet and also benefiting our economy; the same is true when we promote ways of saving electrical energy and natural gas consumption.

These practices can generate productive projects that help generate a sustainable economy. What is produced on campus can be put up for sale: fertilizer made from compost, earthworms, humus, vermifeal, nuts, seeds and medicinal plants; natural by-products such as soap, ointment and cream; and excess materials such as paper, cardboard, aluminum etc.

Aside from these actions, we can cite examples of specific practices implemented to support members of the campus

community living in poverty. The following are some of these examples:

8.5.1 Building sustainability, developing leadership

*“A lot of small people, in small places,
doing small things
can change the world”
(African proverb)*

Sustainability as a subject and its application in education is complex, as it implies many social, economic and environmental aspects that affect one another in a dynamic interrelationship. Quite often sustainability projects fail not because of a lack of funds, knowledge or skills on the part of participants, but rather due to the fact that the team necessary to overcome the complex challenges never fully comes together or ceases to function as such before reaching its goals. The hope is that it simply comes together and works automatically. However, what often happens is that interpersonal and communicational problems between participants get in the way and lower productivity, or worse, put a complete stop to the project as those involved burn out and decide to quit.

The processes of communication and leadership are key to understanding how groups function, what to do to keep them going and increase productivity when working together to achieve the goals put forth at the outset, while doing so in a pleasant atmosphere.

In order to attend to this important

formative aspect for those interested in moving towards sustainability, an introductory module, *Tools and strategies for creating a sustainable campus*, was created with the aim of developing leadership potential among participants. It is also important to note that the course module’s designer, Chris Adam, is a professor at Dawson College and has had more than 20 years of experience giving courses on leadership development yielding positive outcomes.

This successful methodological approach entails intensive, strategic group work in which participants learn theoretical and practical leadership skills, and have opportunities to comment and discuss how this new class material can be implemented in their respective work. Group work is carried out in nature and is used as a catalyst to unlock and inspire the writer, artist, scientist or storyteller we have inside of our wonderful selves.

Being outdoors also allows facilitators create an emotional atmosphere that helps individual and collective growth that simply could not happen in the same way in closed-off spaces. For the purposes of this program, nature is conducive for the development of intelligent, creative, critical and caring people. This educational and philosophical approach results in a meaningful personal and professional exchange of experiences related to sustainability that quickly builds trust and group cohesion –an important factor for the success of the course and the networks therein established.

With critical students tasked with initiatives, duties and projects, opportunities become available to put skills learned into practice, be involved in making ethical decisions and experience the results first hand. Consequently, facilitation by experts in group dynamics is important in order to respond to situations that may arise.

The content of the leadership course will give participants the chance to develop a vision for and sense of their own and others' experience, which is elemental for the group's cohesiveness and functionality.

A cooperative, experience-based teaching approach has the ability to shape the dynamics of group work. The paragraphs that follow illustrate specific course content and teaching/learning strategies that favour leadership development and positive group functionality.

Leadership theory helps to understand, among other things, the role group policies play, the common causes of frustration, anxiety and tension that often arise, and possible ways to alleviate those feelings. It also helps understand the role of physical environments and how some of them favour a more pleasant atmosphere for group work.

Other aspects of the course content are related to the values of accountability, discipline, respect, trust and camaraderie. To acknowledge them as fundamental elements of a functioning group is a task that must be ca-



ried out in an experiential, rather than a discursive, manner.

In this sense, it is important to have the group engage in concrete activities that involve interaction between members, such as those that imply challenges, require discussion in small groups and larger plenaries in which decisions are made.

It is also pertinent to observe group performance in the hopes of identifying the role of different members in tasks aimed at group capacity-building. In doing so, interaction diagrams can be used to catalogue interaction between participants, each individual's role, their listening skills, their openness to others' ideas and their contributions.

Presenting those diagrams and any other material produced during observations will facilitate individual and group reflection on how well or not

the group works. It also constitutes a step forward in strengthening and, consequently, striking a balance that will enable the group to achieve its goals.

It is key for participants to learn the content in an experiential manner by participating in brainstorming, sharing their sentiments and feelings, and, as previously stated, doing so in the much more enriching environment that is nature. This space can act as a teacher, a scene of human interactions, a challenge and an inspiration for peace and harmony, helping people reach their full potential, both individually and socially.

The goal of implementing these types of teaching/learning and leadership strategies into course content is to engage participants in the experiential learning of their own experience as group leaders. This helps participants evaluate the well-being of the group and solve problems when working with other groups. This will result in the ability to form more productive and motivated groups that feel they are making a contribution and are valued for it, which is very positive for future sustainability projects that require these types of working groups to tackle the complex social and environmental problems they face.

8.5.2 Creating a peaceful environment

“Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms.

It shall promote understanding, tolerance and friendship among all nations, racial or religious groups, and shall further the activities of the United Nations for the maintenance of peace.”

Universal Declaration of Human Rights, Article 26.

Peace Gardens – reconnecting the community and nature – an experience to share and recreate.

In 2006, the campus of Dawson College experienced a horrifying school shooting. Five years later, the College inaugurated the *Peace Garden*, containing more than 10 000 plants. But why a garden?

This is because gardening is an act of love and care, which is exactly where we want to focus our energies. Gardens symbolize life, growth and rebirth; they celebrate diversity and act as spaces of learning about nature and recycling. In sum, they act as teachers or tutors. As a sustainability initiative, they symbolize non-violence, social justice, and care and respect for all other living beings.

They say that our landscape defines us. And here, in this special place, Dawson has taught the world how, in spite going through a tragic event, it has managed to face down fear and replace it with love.

Being in nature has an impact on peoples' mental state, mood and sense of security. It helps people socialize (Kaplan, 1992) and create community. The construction of the garden involved the work of over a thousand volunteers and was part of

the healing process for a community in mourning. It has been a living classroom in which biodiversity has been an active participant enriching our urban surroundings. In that sense, the garden is both a memorial, a space for teaching and place to be in peace.

The garden is a project that has cultivated a sense of belonging to a place and a community. This strong sense of belonging has achieved positive effects in the community by reducing negative behaviours and further engaging com-

munity members to resolve their disputes. Furthermore, the journey that has been Dawson's *Peace Garden* has been internationally recognized as a practical example of learning to build environments of peace.

This example, adapted to the local context, has already been replicated on a few campuses in Mexico, as part of the project *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability*. In one of them, participants made a *Health Garden*. Its





design, construction and upkeep, aside from offering a peaceful environment, contribute to recovering, valuing and propagating traditional knowledge on medicinal plants from the region, as well as from other cultures throughout the world.

The *Health Garden* on this campus has ample theoretical support and is, at the same time, a source of inspiration for research by students and faculty interested in traditional medicine. Participants put in practice not only the cultivation, but also the use of medicinal plants among members of the campus community in order to strengthen their immune system and prevent or alleviate problems related to cancer and other chronic degenerative diseases, such as diabetes and hypertension, through the use of Neem, a sacred plant from India, and Noni and Stevia, the natural sweetener which also has many medicinal properties.

At another campus, participants built a garden as a multi-purpose space – a place to study and to feel at peace. Its completion was the result of the participation of

students, professors, friends of the campus, as well as a gardener who enthusiastically shared his expert knowledge.

Both the preparation of the area as well as the construction of the garden were an opportunity to experience teamwork and the implementation of initiatives on how we organize ourselves and design our space. This included the use of materials such as old tires, plastic containers and the trunk of a fallen tree which, following an artistic and creative effort, were transformed into flower pots and a welcoming meeting space.

Cleaning the area set aside for the garden and the compost involved the participation of around 100 volunteers working in human chains, shovelling, digging and pushing wheelbarrows. They managed to remove three tonnes of organic material that was brought to a municipal composting centre so as to be made into organic fertilizer using industrial processes.

Beyond the transformation of the actual space, the work brought together people who had never previously done anything together, and even led some to put aside their differences. An atmosphere of joy, fun and enthusiasm prevailed while participants grinded away, shared a refreshing snack and revelled in their collective satisfaction upon seeing the outcome.

There was no lack of worrisome moments, for example, when seeing a professor get hurt on the job and going to his or her aid. Fortunately, none were too bad, and participants kept the show going – singing, laughing, working and



making their skills and talents shine, adding their personal touch and finding common ground with other members of the campus community whom they may not have known beforehand or with whom they had never shared a similar experience.

Proof that the community started to generate a sense of belonging to the space is the fact that, on their own initiative, they proposed to strike committees for the upkeep of the space and the plants. Later, they decided to initiate new projects and planted fruit trees, as well as edible, spice and medicinal plants.

When painting the trunks, the group got excited about working with art and creativity, and then began painting rocks as decorations and discussing the possibility of making a mural to enliven the space.

Building the garden was in itself an opportunity to create an environment of happiness, peace, solidarity and harmony. Much like at Dawson College, we were able to appreciate the emergence of the desire and will to care. As such, the construction of the garden brought to light a variety of knowledge that participants were able to share, from the proper use of a shovel, pick, hoe and wheelbarrow – tools that some were not at all familiar with – to the use of a video camera, which proved to be an important resource for documenting the experience. The video footage was then shared and used to encourage others to build their own peace gardens, which have so much to offer to our natural surroundings and to the essence of who we are as human beings.



8.5.3 Greening the campus: the *Living classroom*

*"If you are planning for a year,
sow rice.
If you are planning for a decade,
plant trees.
If you are planning for a lifetime,
educate a person."*
Chinese proverb

This project attends to the fundamental task of creating harmonious, meaningful spaces for learning, and in the context of attempting to carve out such a place emerged the *Living classroom*.

Carving out spaces presents an opportunity for different actors of the campus community to make these spaces their own and turn them into viable options for teaching/learning in a peaceful environment. Looking back, as efforts for sustainability have been brought together with the opening of these spaces, sustainability has, in turn, been the driving force behind their design, construction and organization.

Living in harmony with nature – learning

from it, sharing with it – is what is permanently on offer for the regulars and visitors in this space. In the *Living classroom* there are an infinite number of educational activities: the proximity to nature and the diversity of plants and animals will undoubtedly prove to be learning opportunities. The upkeep of the space is a collective responsibility, and thus a great way to help create a much-needed culture of the common good, well-being, coexistence and peace.

The Benito Juárez Teachers' College has shown interest in being part of the educational institutions that are working on sustainability on campus. This is why, when sharing the modest steps taken to increase their green footprint, they demonstrated a reciprocal commitment to continue down the path that others have already begun to clear.

8.5.4 *Green Earth Club* : a student organizational experience

Building a sustainable campus requires the participation of the campus community. In order to achieve the goals established, follow up and keep the implemented processes going, it is important to be effectively organized.

Dawson College is very large community comprised of 11 000 students and 650 faculty members, in addition to its administrative and maintenance staff. This is both a source of wealth in terms of the far-reaching impact that a project can have, as well as a challenge that poses reaching out to the whole community and carrying out the tasks needed to be

a sustainable campus.

The Green Earth Club is a student organization that has set out to take on this immense challenge. The Club has been conducting awareness campaigns and different activities to protect the environment, using social media and word-of-mouth to get their message out, and murals and posters as tools to make people think about environmental issues.

For club operations, the College offers event space, materials and access to printing, while the Student Union provides a meeting space and a small budget for our activities.

As a Green Earth member, I have learned important lessons on student organization for sustainability. First of all, it is vital to make allies and work collectively for the betterment of the school. Having more interested people and groups aboard has allowed us to strengthen our initiatives; we will keep getting stronger the more participants we have.

Another important aspect is to work to ensure the group is accountable and well structured, with a clear idea as to what its commitments are. Having a meeting space is helpful, but it is crucial to set out work deadlines for the coordinating, evaluating and disseminating of our work.

As students, we are able to effect meaningful local change. By working together, we have the power to generate positive transformations in our institutions.

8.5.5 A carbon-neutral campus

Every day, 70 million tonnes of CO₂ are released into the atmosphere as a result of human activity. This and other greenhouse gases are contributing to global climate change and sea level rise, while nations all over the world have been trying to reduce emissions.

Since 2004, Dawson College has reduced its energy consumption by 30 percent and waste sent to landfills by 29 percent. Each year, it recycles more than 100 tonnes of waste. Although the college has reduced its ecological footprint, there is still much more to do.

The Sustainable Dawson Initiative, with the help of consultants, calculated the total campus CO₂ emissions for the first time in 2011-12. The result was 914 metric tonnes generated from the use of:



- Transportation –154 mt (airplanes, trains, taxis, buses, rental cars and hotel stays)

- Energy – 488 mt

- Waste – 272 mt

Unions, students, faculty and administrative staff were then asked to support the campaign to raise the \$13 710 needed to enter into the carbon market and buy credits for \$15 a tonne. Students measured how much CO₂ each room in the College emitted, calculated its weight and arrived at a price, and people from the department funded the areas under their purview. The response was really positive.

The funds raised were allotted to purchase certified carbon credits linked to a virgin rainforest in Peru as an offset (the forest has and will absorb an equivalent amount of CO₂ to that produced at Dawson), in which the consultants will help establish cooperatives for local families. These cooperatives will make it possible for hundreds of people to harvest Brazil nuts sustainably and help them process

and sell their product. Thus, the zone's biodiversity will be further protected.

The Carbon Neutral Campus project is a prime example of the social, economic and environmental objectives of the work for sustainability at Dawson College.

8.5.6 Creating community through work and play

*"I have a white rose to tend
in July as in January;
I give it to the true friend
who offers his frank hand to me"*

José Martí

The project *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability* included diverse activities at participating campuses in Montreal and Morelos.

Working closely with the land – clearing and preparing the soil, planting, fertilizing, setting up and maintaining green spaces – was one of the common practices never failed to generate friendly, cooperative



and joyful atmospheres, in which the ability of members from the different campus communities, and even between students and professors from the North and South, to work together was put to the test. Working together in several different ways on the Peace Gardens was undoubtedly an important to social sustainability.

In developing to their full potential, human beings need spaces for fun, physical activity and spending time with others. As such, we decided to share two activities that took place in conjunction with the sustainable campuses project that attest to the relevance of recreation in the fight against poverty as an existence and the building of peaceful environments.

8.5.7 A peculiar hockey match

This activity was a clear example of the creative capacity of young people. It seemed crazy, but, in the program of activities for the couple of volunteers from Dawson Collage, set to stay for six weeks at one of the university campuses in the sweltering hot state of Morelos, there was a session to teach hockey to the campus community scheduled.

The undertaking had actually started well before they got on the plane, when they set out to get players from the Dawson hockey team to donate around 20 hockey sticks. This, of course, also meant they had to pay a considerable amount for excess baggage, then transport the sticks to the university campus and finally begin to train the recently formed team with a considerable language barrier relative to the coach's Spanish and the hosts' English.



Fortunately, the effort was not in vain; the hockey lessons were successful activities, as word spread via social media to members of other campus communities who then invited the illustrious team to their institution to learn how to play the sport and organize a tournament in which administrators, professors and students participated. The hockey gatherings were posted on facebook and thus made their way back to Dawson.

The cheers, laughter, joy, enthusiasm, excitement, cultural exchange, physical activity, learning, recreation, friendship, cooperation and teamwork set the stage for members from different campus communities to get a bit more interested in the ongoing sustainability project in which they were now sharing knowledge on how to create peaceful environments.

8.5.8 A sustainable professional practice

Similar results were achieved in a recreational event organized by the Benito Juárez Teachers' College, in conjunction with faculty and the coordinator of Sustainable Campuses: Sha-



ring Our Knowledge for Social and Environmental Sustainability. The event was meant to be a practical exercise for undergraduate students in Physical Education.

They held a day-long series of activities during which students from different campuses, who did not necessarily know each other, were to form teams.

These teams were tasked with learning games and then competing with each other. It was also enjoyable when everyone got together to have lunch in a cordial and friendly atmosphere, which undoubtedly laid out the conditions for the 150 participants that came to reach their full potential.

8.5.9 Coasties united

*"Friendship is a shower
of precious flowers"*
Nezahualcóyotl

Costeños unidos (Coasties united) are a group of students that were given that

name by the community at the Benito Juárez Teachers' College, and it is to this group that the following section is dedicated.

In an evaluation process, everything is considered, both the good and the bad. On November 8, 2013, during the touching inauguration ceremony of the *Living classroom* and *Living water* projects, we shared many of the positive aspects. But certainly, there are a lot of things to improve, initiate, redo, change, remove, etc...

... I'll try to explain the reason why this section is for them.

Coasties united are a group of six students at the Teachers' College from a rural community in the Costa Chica (small coast) in the State of Guerrero. For their families, it is a huge financial and emotional undertaking for them to be able to study and live in Cuernavaca.

Ingrid and *Manuel*, two simultaneous



hurricanes, left a trail of destruction in a large part of Southern Mexico; one of the most devastated areas is where those we dubbed *Coasties united* call home. They lost almost everything, including their crops, and roads were blocked preventing the six from going back to be with their families.

They then reached out for support from their home away from home, the Benito Juárez Teachers' College, requesting that the administration extend the tuition deadline to give their families time to get back on their feet and then pay. What they did not want was to have to quit their studies.

Right around the same time, the Teachers' College was making plans for the construction of a *Living classroom*, which would offer the campus community an open-air educational space surrounded by nature.

There they could conduct their experience-based classes – part of every speciali-

zation at the College – in a space directly linked to the institution's sustainability project, allowing future teachers to bolster their training by acquiring more pedagogical tools. It would be incredible to have such a space, but at the time it was still too expensive to get off the ground. The idea was put forth, and with luck, one day, the dream would perhaps become a reality.

The institution's financial director, another young person from Guerrero of humble beginnings – whose family also suffered, albeit to a lesser extent, the impact of the hurricane – came up with a mutually beneficial idea. "Look, guys," he said, "work on the campus grounds, help us build the *Living classroom*. That way, you'll pay off your tuition."

This is how these coasties, along with other students that joined in, got together a proper team and started construction. Not long after, with all the helping hands and willpower brought to bear, they not only transformed a physical space, but

also transformed their outlook, that disposition stemming from their characteristic humility and modesty. They became proud to belong to a project to make their campus sustainable as they shared their knowledge.

The campus community started to become curious about the six who would change from their uniform into work clothes after class, coming and going like workers lugging rocks, carrying soil, loading wheelbarrows and bringing in plants.

The activity aroused the curiosity of the College. Little by little, people would muster the courage to go up to them and ask what they were doing, why they were doing it and how the space would eventually be used. Soon after, they started calling them *Coasties united*.

Aside from demonstrating their knowledge of gardening and construction, our *Coasties united* taught us a lesson with their positive attitudes, camaraderie, teamwork, eternal smiles and sense of humour.

As a communicative strategy to make this experience and the people behind it known, the institution, via its radio program *Cosas de profes* (Teacher Stuff), interviewed *Coasties united* on several occasions (www.bjmedia.mx).

8.5.10 North/South solidarity

In *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability* project, there were many

instances of solidarity from members of the campus community at Dawson College, the Canadian counterpart of the project, towards the participating institutions in Mexico. What follows are two specific examples :

8.5.10.1 Volunteers working on campus (Gabrielle, Kendall, Katy)

The Benito Juárez Teachers' College, along with two campuses of the National University of Pedagogy, were able to benefit from the presence of three young Dawson College students who dedicated a month of volunteer work on the ground, plus many more hours leading up to and following their stay.

They offered up their tools, knowledge and a lot of physical labour and carried it out collaboratively with discipline and open-mindedness under the hot sun in order to share their experience from working in the Peace Garden. Their work included sharing their knowledge on making prototype water-saving irrigation systems, planting vegetable and about student organizing at Dawson, all of which were adapted to the local context.

8.5.10.2 Raising funds

The distance between Canada and Mexico did not prevent campuses from coming together to share their culture and knowledge in order to move towards sustainability. As part of the joint project, a group of students in the course "Principles



of Fundraising” set out to raise money du-ring the semester to support actions forsustainability on campus at the National University of Pedagogy in Morelos.

This enriching act of solidarity aimed to raise \$1000 CAD. To that end, the group enthusiastically carried out multiple activities including an outreach video and other communi-

cations strategies that helped people understand the context of the campus for which they were raising funds. Beyond the actual dollar amount raised, it was a learning experience that broadened the perspectives of the par-ticipants involved at both institutions as well as of those who became connected through social media.

9

Reflections on the path to sustainability

9.1 UNDERSTANDING A LOCAL CONTEXT THROUGH ITS SPECIFIC NEEDS (JUAN SALVADOR NAMBO)

The path to sustainability has not been easy at the educational institutions in Morelos. The effort put forth at these postsecondary institutions to achieve the goals laid out demonstrates existing institutional limitations and a lack of understanding of what sustainability really means (it is often used as a synonym for ecology and not as a balance between people and their environment), not to mention the campus community's indifference.

The World Commission on Environment and Development (1987) explained that sustainability, or sustainable development, involves transitioning from quantitatively conceived development – hinged on economic growth – to a qualitative type of development linked directly to

economic, social and environmental areas of concern. This would entail a renewal of the institutional framework so that it is democratic, participatory and capable of seizing opportunities that simultaneously improve all three areas without the advancement of one diminishing the others.

It was in this framework that we were able to be part of Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability, whose main objective was to strengthen our efforts towards sustainability in each participating campus: the Galeana, Ayala and Cuernavaca campuses of the National University of Pedagogy and the Benito Juárez Teachers' College in Mexico, and Dawson College in Canada.

As part of the actions to attain these goals, each campus devised a range of strategies to become more familiar with its surroundings. This helped them understand what

their particular needs were, not only environmental, but also in terms of social and economic issues – marking a significant learning experience for students and teachers alike.

In this sense, a methodology began to emerge to map out community and campus-based activities that help participants take advantage of theoretical, conceptual, methodological, technological and organizational tools in order to further advance the cause of sustainability on campus.

The challenge was daunting, which is why organizers were convinced that community participation and the incorporation of environmental education across the curriculum were indispensable to the task at hand. It was also important to acknowledge and highlight the relevance of the professor in this process as the agent of change and generator of hope.

The strategy of mapping out activities on campus and in the broader community that we adopted entails networking to help make visible the actions taken by civil society organizations and individuals interested in sustainability. It also involves informing the campus community on actions taken by governmental bodies and discussing the current situation so proposals can be heard and actions coordinated comprising evidence-based activities (Bottello, et. al., 2012).

This mapping is influenced by Ernest Burgess's theory of concentric circles (as cited in Cajas, 2009), where he develops an urban cartography based on the city of Chicago, dividing it into five concentric zones: 1. the downtown; 2. the pre-

ca-rious zone; 3. the working class zone; 4. the residential zone; and 5. the commuter zone. This same theory can be applied to schools to identify factors that can help the process of achieving sustainability. In other words, constructing a basic map makes it possible to work with different agents for the development of the project towards its objectives, as well as to transfer that experience to the general public or other educational institutions.

The methodology we devised while carrying out the mapping exercise involves five steps :

1. Forming a group of leaders who can pinpoint agents involved in sustainability;
2. Drawing up a “sustainability map” that helps pinpoint the formal and informal groups linked to sustainability efforts;
3. Establishing a working relationship with the groups on campus “agents on the ground”;
4. Reaching out to other educational institutions as well as the general public through social media, internal communications and, above all, in the classrooms;

Phase 1: Forming a group of leaders

In participating educational institutions, forming groups of leaders is linked to the level of participation of each institution agreed upon by project coordinators. However, these leaders must have specific qualities ranging from the motivation to work with both



professors and students, to the organizational skills required for the mapping strategy, managing resources and seeing that the knowledge is transferred to the broader community.

One of the main roles of these leaders is to liaise with the municipality, state government and associations, as well as to be one of the key people in the mapping process. As such, they are the ones with the most information on the needs of sustainability at an institutional, local and global level, and on qualitative and quantitative indicators regarding the situation in the region.

Phase 2: Drawing up a sustainability map

Getting involved in the processes on and off campus opens the door to the second phase in which the map will take shape. This implies demarcating a zone of action, target populations, available resources and proposed actions. It is also vital in this process to

pinpoint the agents on the ground and to support the development and viability of their initiatives. As part of the process, we were able to set an agenda which allowed us to collaborate with specialists on water and energy efficiency, composting and biodiversity, and work with organizations that, when learning about the project, donated plant species or offered training.

Phase 3: Working with agents on the ground

In this step, leaders should already be clearly in place, so as to see to it that activities go as planned. At this point, various individual sustainability-oriented activities would already be underway. It is in this phase, once the key projects for each campus are decided upon, when contact is established with agents on the ground that will stimulate the project through different activities. It is important to understand the role of these agents (participants that know the community and/or the subject matter and the project un-

derway), who will be those that keep the project going. In addition, priorities will have to be determined depending on the contribution of each agent and the needs of the project.

Most campuses are in this phase and have been developing an agenda to orient the proposed actions.

Phase 4: Reaching out to other educational institutions

Surprisingly, the social dynamics at play on some campuses hindered direct con-

tact between the campus community and people from an organization with experience in community development. Nevertheless, it was quite significant that the Benito Juárez Teachers’ College was able to establish such contact thanks to leaders and agents on the ground who facilitated the creation of a peace garden, a workshop-based course on creating sustainable campuses, a green classroom and the installation of a rainwater harvesting system used for drinking water. In order to do this type of work, campuses should bear in mind the following table:

Table 1: Drawing up a sustainability map

Type of Resource	Population	Assets	Comments
Individual resources	Community members, Families, Neighbours	Ability Passion Talent Skills Experience Knowledge Time Focus	What is good about where they live? What can they do to improve their community?
Formal associations' resources	Religious groups, Organized sports Youth associations Volunteer programs Neighbourhood associations	Vision Networks Knowledge Teamwork Influence Talent	What are the formal networks in a given community?

Original adaptation from Botello, et. al., 2012

Type of Resource	Population	Assets	Comments
Informal associations' resources	Informal support networks	Vision Networks Collective knowledge Influence Collective spaces Talent	What are the informal networks in a given community?
Physical resources on and around campuses	Parks Educational centres Libraries Children's centres	Facilities Collective spaces	What green spaces, unused spaces, buildings streets, markets, and transportation are there in the community? What sustainability projects could be implemented there?
Economic resources	Local businesses and shops Campus cooperative	Funds Influence Facilities	What is the local economic situation? How does this relate to sustainability?
Cultural resources	Theatre Music Art	Vision Networks Collective knowledge Influence Collective spaces Talent	What types of musical, theatrical or artistic talent do they have? How can this relate to sustainability?
Official resources	Municipal services State government services Neighbourhood representatives Police Social workers Family doctors and nurses	Funds Facilities and resources Ongoing or prospective services Influence over others Time Power Knowledge Leadership Skills Willingness to make a positive change	What type of resources do these bodies have, regardless of whether or not they use them?
Educational institutions' resources	Directors Administrators Professors Students Parents and guardians Programs of study	Vision Networks Collective knowledge Influence Collective spaces Talent	What type of relationship do they have with the community? What sustainability projects are they working on?

The latter two were drawn upon most often during the project. The following techniques were used to explore options and ideas with people tied to these resources:

- In-depth interviews: A face-to-face meeting (Taylor and Bogdan, 2010) between project leaders and a given person who may have some insight. This technique is aimed at understanding the perspectives of those involved in the project, such as leaders and agents on the ground
- Participant observation: This includes three main activities (Taylor and Bogdan, 2010): social interactions that are not offensive and collecting relevant data. Leaders should be involved together with the campus community, agents on the ground and the local population. The goal here is to gather information that helps participants determine the progress of the project.
- Base de datos/web/redes sociales.

Table 2: Techniques to explore options and ideas for sustainability map.

Type of Resource	In-depth interviews	Participant observation	Data bases/websites/ social media
Individual resources			
Formal associations' resources			
Informal associations' resources			
Physical resources in vicinity			
Economic resources			
Cultural resources			
Official resources			

Original adaptation from Botello, et. al., 2012

Phase 5: Transferring this knowledge to local agents and the general population

Internet tools have been very useful in promoting collaboration and gathering information in this project, which will soon be one year in the making at the various campuses in Mexico. However, not everyone in the local and campus com-

munities has ready access to the Internet. Consequently, this phase is about reporting and disseminating results through other means (information sessions, meetings, community fora, newspaper articles, etc.). From this point on, the work becomes revitalized, engendering new processes. One important example of this is the journalistic and dissemination efforts of the radio program Teacher

Stuff, produced at the Benito Juárez Teachers' College, which has served as a direct link between Mexico and Canada

9.2 ASSESSING THE EXPERIENCE

In order to reconstruct the experience that was *Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability*, we organized a workshop to assess the project with the coordinators and campus representatives.

The assessment sought to arrive at an interpretation of the process stemming from the voices of the participants. It was conducted using thought-provoking questions divided into nine blocks, with each block being examined twice:

Individual reflection – participants wrote down their thoughts on each of the nine questions.

Collective construction – participants shared their reflections in relation to

each topic.

The project allowed participants to rebuild their relationships with themselves, those on campus and their social context. Many of the participants stated that it changed the way they look at life.

The project made it possible for the campus community to integrate knowledge and carry out concrete actions to better the environment. Those involved broadened their understanding of their socioenvironmental reality while acknowledging other visions and convictions.

The most significant achievements of the project were getting students, teachers, administrators and support staff involved; developing common theoretical frameworks on the issue of sustainability and environmental management; and ensuring the teamwork and commitment of participants.

Participants successfully integrated dif-





ferent values, attitudes and knowledge in one collective *savoir-faire* and ability to take committed action.

Professors highlighted the shift in their educational role: while at first they were facilitators of change who sought to include the topic of the environment in several of their classes, they later became designers of learning spaces to bolster the study of the environment.

For their part, students expressed that they experienced a change in the way they view the world and their relationship to the environment, in their lifestyle when including sustainability as part of their everyday principles. This also included new ways of viewing “others”, acknowledging different realities, discovering the potential of taking action and improving self-esteem, and strengthening teamwork skills and interest in sharing knowledge. The students became project managers, and were able to reflect on that process and its implica-

tions with questions such as: Who are we? What do we want? What can we accomplish together?

The project coordinators strengthened their commitment, increased their participation and improved their ability to negotiate and intervene. This emboldened the mutual trust they shared, which was the foundation of the project from the beginning and at each step along the way.

The cornerstone of environmental education is ethics. Participants identified some of the values underlying the experience: trust, hope, respect, solidarity, perseverance and tolerance, values that permeated the decision-making process.

The projects bolstered their sense of belonging to the community and hope in the possibility of making change in society.

The institutions made headway in the inclusion of sustainability in some of the classes, even if this was limited to those teachers who took part in the project.

As a result of this experience, research projects and Dawson College student internships in Mexico, and vice versa, sprouted.

Similarly, there was an emerging of local leaders, not constrained by traditional hierarchies but rather by incorporating them so that their collaboration could respond to local interest and to the initiatives. This meant that our achievements were also carried out more efficiently.

The project fomented an inter- and intra-institutional linking, as well as the participation of governmental bodies at federal, state and municipal levels.

In terms of leadership and decision-making, there was some observable progress made in terms of breaking with typical power relations and vertical structures. This included a shift in the roles of students, professors and directors, and the emergence throughout the project of students as leaders.

The project was disseminated via social media, radio and TV programs, print media, Dawson College newsletters, posters and postcards.

Project operations were subject to certain limitations, such as the lack of organizational structure for managing resources, administrative issues due to the fact that no one was familiar with the differences in how each institution operated, as well as the different auditing procedures and tax forms relevant to Mexico and Canada.

The difficulty that the campuses had in evaluating and planning their needs and levels of commitment hindered the flow of funds designated for their actions.

Project outcomes

The project laid the foundation for the establishment of a learning community that spans the participating institutions. Working within that framework allowed participants to explore a range of possibilities for the promotion of sustainability education.

The path to sustainability requires that those involved acknowledge the negative impact that the current model of development has on the environment and the need to build a more harmonious, just and fair world.

There was progress made in the objective of creating an adaptable and flexible model, so as to promote it in other institutions.

Learning processes were promoted in the campus community, even if the more substantial impact was felt within the teams who coordinated the project. The students managed to design and carry out environmental projects, in which their main successes were in the areas of values and attitudes. They considered that the project was life changing, in that it promoted the quest for the common good. They were able to get their local communities to appreciate nature more deeply.

In terms of sustainability research, research proposals were formulated at the National University of Pedagogy – research that is expected to begin next semester.

Other benefits deriving from Sustainable Campuses: Sharing Our Knowledge for Social and Environmental Sustainability were the environmental projects in educational institutions that further enabled integrating environmental content into the curriculum of different courses in different fields and into academic research – all of which increased students' ability to engage in sustainable action.

10

Concluding remarks

This document outlines a methodology that can assist the work being done in other institutions to develop projects that will have appreciable, meaningful impact – ranging from the formation of teams of leaders to the transfer of knowledge to local community members. On the same token, it reinforces the need to work with society at large and the groups that represent it in order for campus projects to have such

an impact. Although approaches may vary, we attempt to show how leaders emerged on campus as well as in the local community as the projects unfolded. All of this involves complex learning processes, above all when considering the small steps vis-à-vis one's local reality required for sustainable development – a term that still presents many difficulties to understand and work with in all its complexities.



WORKS CITED

Book and periodicals

Boltvinik Kalinka, Julio (2005) *Ampliar la mirada. Un nuevo enfoque de la pobreza y el florecimiento humano*. Volumen I. Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS). Jalisco, Mexico.

Botello, B., Palacio, S., García, M., Margo-
lles, M., Fernández, F., Hernán, M., Nieto,
J., y Cotiño, R. (2012). "Metodología para
el mapeo de activos de salud en una co-
munidad." *Gaceta sanitaria*. Vol. 27. Núm.
02. March 2013 - April 2013

Cajas, J. (2009). *Los desviados. Cartografía urbana y criminalización de la vida cotidiana*. México City: Porrúa, UAQ

Contreras MacBeth, Topiltzin (2010) et. all
Biodiversidad en Morelos. Gobierno del Es-
tado de Morelos. Editorial LUWERG. Barce-
lona, Spain.

Cházaro, Sergio. (coordinador). (1999).
*Uso sustentable del agua en México. Reto de
nuestro tiempo*. Seguros Comercial Améri-
ca. Mexico.

García, R. (1994) "Interdisciplinariedad
y sistemas complejos", en Leff, E. (comp)
Ciencias sociales y formación ambiental.
Mexico, D.F. Gedisa/UNAM

Hurtado Badiola, Margarita. (Coordina-
dora) (2010). *Los relatos como estrate-
gia educativa para reflexionar sobre los
efectos del cambio climático*. Xinemi-UPN
Morelos. Mexico.

Brundtland. G. Harlem (1987). *Nuestro
Futuro Común*. Comisión Mundial para el
Medio Ambiente y el Desarrollo. ONU

Kaplan (1992).
S. Kaplan. (1992) The restorative envi-
ronment: Nature and human experience.
In D. Relf (Ed.) The role of horticulture
in human well being and social develo-
pment. Portland, OR: Timber Press. Pp.
134-142.

Leff, Enrique (2013). "Campo controver-
sial en incesante construcción", en Arias,
Miguel, La construcción del campo de la
educación ambiental: Análisis, biografías
y futuros posibles. Jalisco, Editorial Uni-
versitaria, University of Guadalajara.

Maldonado, Teresita (2013). *Modelo de
evaluación y acreditación de Centros de
Educación y Cultura Ambiental*. México,
SEMARNAT (Forthcoming)

Morin, Edgar. 2001. Seven complex les-
sons in education for the future. Paris,
UNESCO.

Novo, María. (1998). *La educación am-
biental: bases éticas, conceptuales y meto-
dológicas*. Madrid. UNESCO

Scholnik, Saúl (2012). *Érase una vez un her-
moso planeta llamado Tierra*. Zig-Zag. San-
tiago de Chile, Chile (Delfín de color, 9).

Electronic sources

Camara, J. J. (February 7, 2014). Revista Digital de Historia y Ciencias Sociales. Recuperado el 7 de Febrero de 2014, de <http://www.claseshistoria.com/revolucionindustrial/concepto.htm>.

Comisión Mundial sobre el Medio Ambiente y el Desarrollo (1987). *Declaración de Tokio*. Consultado en http://www.cma.gva.es/comunes_asp/documentos/legislacion/cas/006000225_1.htm

Datos de salarios mínimos en México y en Morelos. http://editor.pbsiar.com/upload/PDF/censo_e_ingresos.pdf.

Galeana L. *Aprendizaje basado en proyectos*. CEUPROMED. URL: <http://ceupromed.ucol.mx/revista/PdfArt/1/27.pdf>

Helle L, Tynjälä P, Olkinoura E. *Project-based learning in post-secondary education— theory, practice and rubber sling shots*. High Educ, 2006; 51: 287-314.

INECC-CENICA. (2012). *Diagnóstico Básico para la Gestión Integral de Residuos*. Recuperado el 8 de Febrero de 2014, de http://www.inecc.gob.mx/descargas/dgcenica/diagnostico_basico_extenso_2012.pdf.

OECD. (2013). *Municipal Waste*. Recuperado el 8 de febrero de 2014, de <http://dx.doi.org/10.1787/factbook-2013-71-en>.

Reyes, J. (10 de agosto de 2007). *Revolución Industrial en Mexico*. Recuperado el 7 de febrero de 2014, de <http://revolucionindustrialenmexico.blogspot.mx/>.

Rosa, A. C. (Enero de 2007). *La Sociedad de Consumo: Origen y Características en Contribuciones a la Economía*. Recuperado el 7 de febrero de 2014, de <http://www.eumed.net/ce/2007a/acr.htm>.

SEMARNAT. (5 de Noviembre de 2013). *Ley General de Prevención y Gestión Integral de los Residuos*. Recuperado el 7 de febrero de 2013, de <http://biblioteca.semarnat.gob.mx/janium/Documentos/Ciga/agenda/DOFsr/263.pdf>.

Sharing Our Knowledge to Create Sustainable Campuses

Coordinated by : Gisela Frias & Margarita Hurtado
February 2014

Project number: IDRC: 107108-00020699-012
Project name: IDRC: Sharing Our Knowledge to Create Sustainable Campuses
Country/Region: Canada and México

Institutions involved :

Dawson College
3040 Sherbrooke St. W.
Westmount, Quebec
H3Z 1A4
Canada

Instituto Mexicano para el Desarrollo de Ciudades Verdes, S.C.
Rayón 30
Centro Histórico
C.P. 62000
Cuernavaca, Morelos, México

ISBN: 978-607-95722-5-9

This work is used with the permission of Gisela Frías and Margarita Hurtado

Synopsis:

Based on experiences and ideas emanating from the bi-national project “Sustainable Campuses: Sharing our Knowledge for Social and Environmental Sustainability” as well as from other like institutions, this text seeks to inspire and make educational facilities interested in moving towards sustainability.

Key concepts: Education, sustainability, campuses, environmental management in schools, methodological strategies, poverty



This work falls under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International license

